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Communications—Electronics—Photography

MAR 1 1957

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FEBRUARY 22ND

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Abraham Lincoln

FEBRUARY 12TH

". . . That government of the people, by the people, for the people, shall not perish from the earth."

February 1957

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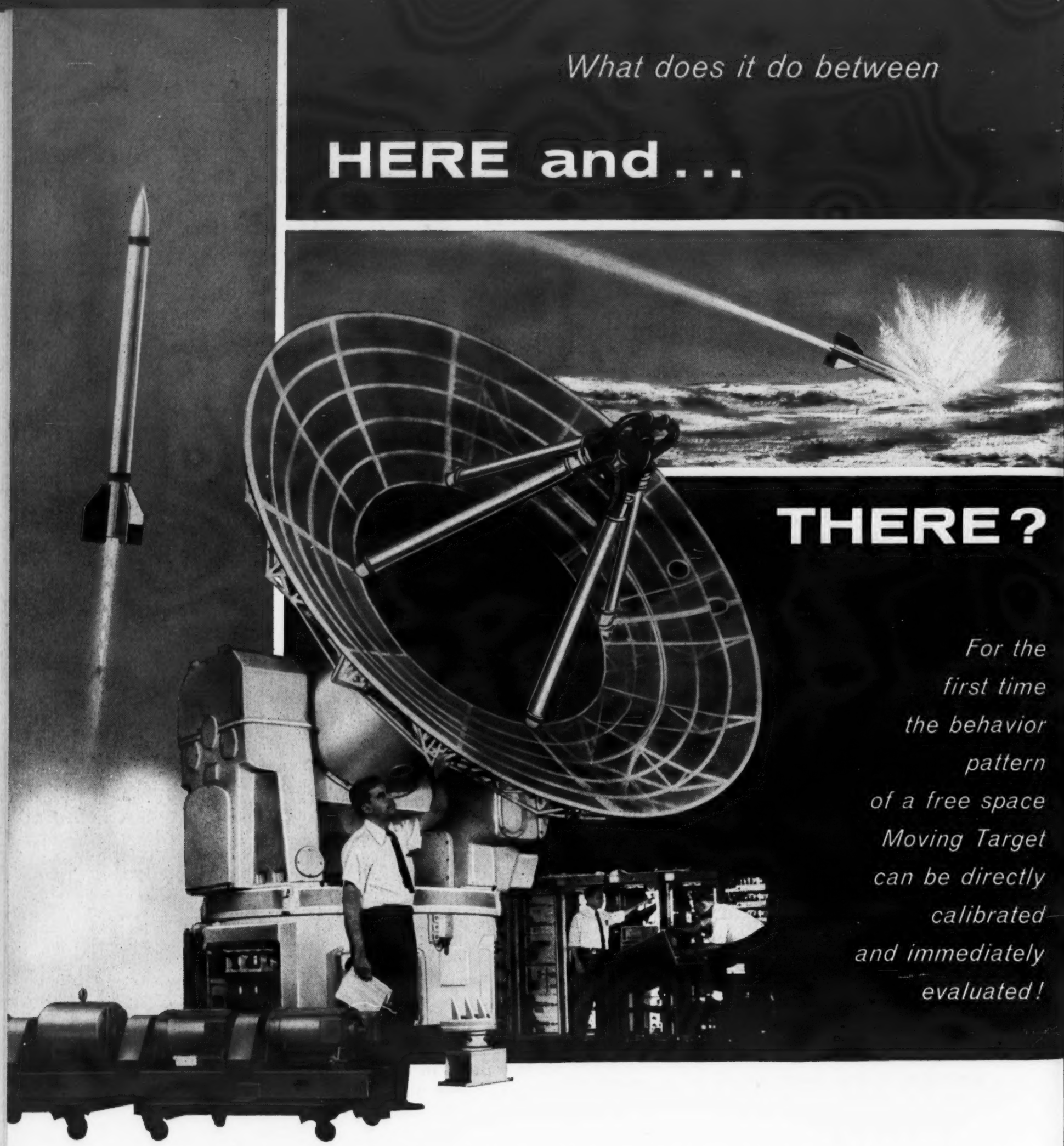

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In the past, this data has depended upon optical devices, triangulation systems with long base lines and precision limitations, modified radar equipment and data reduction methods often requiring months for computation. The immediate availability of data evaluation provided by the AN/FPS-16, now being built by RCA under cognizance of the Navy Bureau of Aeronautics for all services, is a great forward step in Range Instrumentation.

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EPA

SIGNAL

Communications-Electronics-Photography

Journal of the Armed Forces Communications and Electronics Association

VOLUME XI FEBRUARY 1957 NUMBER 6

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1957 AFCEA CONVENTION

Washington, D. C.—May 20, 21, and 22

Once again we wish to stress the importance of making hotel reservations for the 1957 Convention. Even though your Convention Committee representatives have reserved a goodly number of spaces at the Sheraton-Park and Woodner Hotels, you cannot afford to wait too long. It is easier to get a reservation early and cancel it later if necessary. Also available for early reservation are rooms at the new Marriott Motor Hotel just across the Potomac 14th Street Bridge.

The following addresses are listed for your convenience: Sheraton-Park Hotel, Connecticut Ave. & Woodley Road, N.W., Washington 8, D. C.—Woodner Hotel, 16th Street & Spring Road, N.W., Washington 10, D. C.—Marriott Motor Hotel, Twin Bridges, U. S. 1, Washington 1, D. C.

Program and Exhibits—All at the Sheraton-Park.

Sessions—Top-level coverage from Industry and Government. Plan to bring your family. They will enjoy the Nation's Capitol. For further information, see page 5.

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test	condition	duration	end point at 25°C
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vibration	100 to 1000 cps at 10 G	3 cycles, each x, y, and z plane	I_{CO} = 2 μA maximum at 5V
vibration fatigue	60 cps at 10 G	32 hours, each x, y, and z plane	h_{ob} = 2 μmhos maximum
shock	40 G, 11 milliseconds	3 shocks, each x, y, and z plane	h_{fb} = −0.88 minimum (USN-2N117)
temperature cycle	−55°C to +150°C	10 cycles	h_{fb} = −0.94 minimum (USN-2N118)
moisture resistance	MIL-STD-202	240 hours	h_{fb} = −0.97 minimum (USN-2N119)
life, intermittent operation	P_c = 150 mW, V_c = 30V	1000 hours, accumulated operating time	
life, storage	150° C, ambient	1000 hours	
salt spray	MIL-STD-202	50 hours	no mechanical defects interfering with operation

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AFCEA CONVENTION 1957

WASHINGTON, D. C.—May 20, 21, AND 22
SHERATON-PARK HOTEL

Your previous issues of SIGNAL outlined in general activities for the 1957 Convention such as meetings, social events, exhibits, industrial movies, and technical papers. To date, the Association has contracts for 110 out of 160 reserved exhibit spaces. From the 49 technical papers submitted, 12 will be chosen. The final selection of the 12 technical papers will represent those that best conform to the theme of the Convention.

In the near future each member will receive a form to fill out indicating his desires as to each of the following:

MONDAY, May 20

Opening Breakfast	$2.25
Keynote Luncheon	$4.00
Buffet Supper and Entertainment	$7.00

TUESDAY, May 21

Transportation, Lunch, Tour of Naval Research Laboratory	$ 2.75
Reception and Banquet	$10.00

WEDNESDAY, May 22

Industrial Luncheon	$4.00
Total	$30.00

It is important that you indicate on the same form, in the space provided, whether or not your wife will attend. This is desirable since Mrs. Francis Engel must have sufficient information to plan for interesting activities for the ladies. An early report on the ladies planning to attend the Convention will aid materially in arranging for a tour of the White House and getting clearance for those wishing to tour the Naval Research Laboratory.

The program of events for your annual Convention is rapidly being finalized. With the theme of "Marconi to Mars" indicating progress in communications on our planet to radio contact with outer space in this International Geophysical Year, there must necessarily be much information relating to Project Vanguard (Launching of the Earth Satellite). Consequently, the Keynote Luncheon on May 20 will have as its distinguished speaker to cover this important field, Admiral Rawson Bennett, Director of Naval Research. Following the luncheon, there will be a presentation by Admiral Joseph N. Wenger, Director, Communications and Electronics, Joint Chiefs of Staff on Scatter Propagation. The operational requirements, experience to date, impact and problems of this method of communication will be discussed, as well as the joint and single service aspects in this important field.

The entertainment and buffet supper, under direction of the incomparable "Gil" Gilbarte, will conclude the evening event.

On Tuesday, May 21st, technical papers will continue from 10:00-12:00 A. M.

At noon, busses will leave the Sheraton-Park for the Naval Research Laboratory, the Directional Center of Operation Vanguard, where lunch will be served. Following luncheon, there will be a conducted tour of the laboratory showing Vanguard developments to date and other new scientific advances relating to the International Geophysical Year. Busses will return to the Sheraton-Park at 4:00 P. M.

The main reception will begin at 7:00 P. M. in the Continental Room and will be followed by the banquet in the Sheraton Banquet Hall. Notice of the beginning of the banquet will be heralded by the famous 35-voice male chorus of the U. S. Army Band. After the invocation, our own George Bailey, Past President of AFCEA and Executive Secretary of the Institute of Radio Engineers, will take over as Master of Ceremonies. The principal speaker of the evening will be Mr. Donald C. Power, President of General Telephone Company and a distinguished leader of the independent telephone industry.

The industrial luncheon at noon Wednesday will feature one of the most unusual events in our convention history. It will be a symposium directed by the Honorable Frank D. Newbury, Secretary of Defense for Engineering, and his Deputy of Electronics, James M. Bridges. Mr. Newbury has been directing application engineering, that most important phase of engineering that converts the theory of research to practical manufacture processes upon which procurement may be accomplished. Following the presentations by Mr. Newbury and Mr. Bridges, there will be a short stretch break, at the conclusion of which there will be a question and answer period. The symposium should be one of the most profitable periods of the Convention, both for our members and for the National Defense.

the LIFE AND TIMES of the Defense Electronics Industry

by Dr. W. L. Barrow
Vice President for Research and Development
Sperry Gyroscope Company
Division of Sperry Rand Corporation

"—STILL THE QUEEN KEPT CRYING 'Faster! Faster!', but Alice felt she could not go faster, though she had no breath left to say so.—However fast they went, they never seemed to pass anything.

'Well, in *our* country,' said Alice, still panting a little, 'you'd generally get to somewhere else—if you ran very fast for a long time as we've been doing.'

'A slow sort of country!' said the Queen. 'Now *here*, you see, it takes all the running *you* can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!' "

This quotation from Lewis Carroll's *Alice In Wonderland* and *Through The Looking Glass* presents a good theme on which to begin a discussion of defense electronics. For this is a field as near to a "wonderland" as can be found today and it is one in which it takes all the running that the government-industry team can do to keep up, in a technological sense, and, indeed, it requires running twice as fast as that to get ahead and stay there. We are truly living in a fast country in which many of us in industrial organizations sometimes feel a bit breathless, like Alice.

The growth of defense electronics has been an accomplishment of revolutionary character and considerable magnitude. In a relatively short time, spurred by the tremendous needs of World War II, those engaged in what we can now call the defense electronics industry have been transformed from an almost non-competitive hard core of companies into a nationwide array of hundreds of highly competitive firms fighting for technological break-throughs, for technical manpower, for increased capital funds, for improved tools, and for an increasing share of business from the Armed Services.

Let us take a look at several factors that contribute to this growth. Of greatest significance is the intensive *research* through which technical advances are made possible. Pacing these advances all the way have been increasingly demanding requirements. Another factor to be considered is the availability of *funds* to support the defense electronics.

Rapid Evolution

As a first example to illustrate the phenomenal progress of research, I will select the dramatic contributions of servomechanisms. Certainly the rapid evolution from the primitive concept of a servomechanism to the present-day sophisticated theory and practice and many-fold applications has been a key contribution of defense electronics. In the marked change from mechanical to electronic apparatus, the servo has helped convert inept manually-controlled weapons into precision devices.

Instruments and automatic control equipment, such as remote-controlled flight instruments, navigation and bombing equipment, and automatic pilots, have thereby evolved from a secondary role in aviation to a key status in the control of today's high-speed, long-range manned aircraft. Similar progress has been made in land and ship based fire-control systems. Missiles and unmanned vehicles of all sorts would, of course, not even be possible without modern servomechanism technique.

No less dramatic has been the phenomenal development of microwave electronics, particularly radar. Its role in military systems has become so extensive that it is, for all practical purposes, indispensable. Certainly, it has become a vital part of those systems performing the functions of detection, tracking, navigation, and missile guidance. Recent developments in information theory and in scatter propagation are even now opening up new horizons for military electrical communication. Although computers are old in military equipment, the potentialities of electronic high-speed digital computers and data processors, of the general character of the UNIVAC®, are so great no one can yet see the extent to which they will find usage, and many organizations in the defense electronics business will have to run very fast indeed, if they are to "get somewhere else" in this area.

These systems could not have been pushed so rapidly except for the equal speed with which the necessary compounds were made available. Microwave radar at first jumped forward as an infant device with the magnetron. It is now going on to the status of an adult with crystal-controlled high-power klystrons, perhaps one of the most important Sperry contributions to defense electronics. Other tubes, and notably the traveling-wave tube, are also rapidly emerging from the laboratories to become valuable components around which important systems are being designed.

Hardly had we begun to achieve some degree of reliability in vacuum tubes, (a serious problem that is still with us) when the semi-conductor de-

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vices, like diodes and transistors, were unveiled to the art as a major breakthrough, offering reliability, weight, space, and power consumption advantages in electronic design beyond our fondest dreams of only a few years ago. These examples are but a brief sample of the way in which research has turned out major achievements in a breathtaking sequence.

Let us now consider another major factor in the stimulation of defense electronics, namely the pressure of ever more stringent requirements. Much of this pressure from requirements originates from the acceptance of science and technology by the defense establishment. *At every hand in recent years, the most vocal of proponents of scientific and technical progress have been military leaders. In a defense climate influenced so greatly by spectacular atomic and nuclear developments, the military agencies have not only become proponents of more science throughout America, but also adept planners for the technological goals of the future.*

This development is undoubtedly related to the increasing numbers of technically educated officers in the military services. Encouragement within the military of advanced studies for men of scientific bent has been greatly accelerated. The salutary effect of this training is being reflected each day in the give-and-take communications and negotiations between the company scientist and the military project officer. It has made the industry-military team much more productive.

A parallel development has been the enhanced technical stature of the Government sponsored laboratories. Sometimes working independently, but more often hand-in-hand with industry, these laboratories have been responsible for outstanding research, development, and testing accomplishments. With this scientific and technical maturity of the military community, it is not surprising that the descriptions of new missions to be accomplished and the specifications for new equipments and systems often stretch the state of the art and set goals that make us run like Alice and the Queen.

Consider next the influence of the factor of funds, that great American factor—money. Certainly without the tremendous increase in research budgets and planning, defense electronics today would be quite a different thing indeed. Pre-World War II research was budgetarily hampered by limited appropriations. Much that was done then for the military was done on extremely limited Government funds or purely as a company-financed venture; for example, my own company financed the development of the bombsight of World War I and much of the early anti-aircraft development also. The early radar developments were achieved a component at a time and military leaders pleaded for amounts such as $20,000 for their research and development.

Funds Appropriated

Today, the need for a strong national defense posture is echoed not only in the Pentagon and the halls of Congress but by vocal citizens across the land, and funds in vast and ever increasing amounts are appropriated. It has been reported that total military expenditures for "electronics and communications" were:

$0.15	billion	in 1948
0.56	billion	in 1950
2.1	billion	in 1952
2.3	billion	in 1954
2.9	billion	in 1956.

But these figures do not include very large amounts for the electronic portions of aircraft and guided missiles. No figures for research and development expenditures in defense electronics alone are available, but one can be sure that it is a substantial part of the total amount for all R & D, which has grown from $758 million in 1951 to an estimated $1.5 billion in 1957, or doubled in six years, exclusive of AEC expenditures.

These figures indicate that there is, generally speaking, no serious problem of funding. However, in these days of adequate financial support another problem has arisen, namely the insufficient availability of technical manpower. At every hand we hear of the shortage of engineers, the competition for them, and the need for motivating our youth to technical careers. Thus, the problem of this age does not seem to be money but men.

Not only is the support of research and development an attraction to industry, but there is always the hope

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Research and Development Laboratories

HUGHES AIRCRAFT COMPANY

Culver City, California

Relocation of applicant must not cause disruption of an urgent military project.

that a successful development may lead to production in quantities, with still greater dollars of sales. The inflow of money of such large and annually-increasing amounts into this business of defense electronics provides a tremendous stimulant to its vitality and growth.

Some Facts of Life

Let us now consider some of the other facts of life, some favorable, some unfavorable, that one lives with as a firm in the defense electronics business. First, let us touch upon the effect of procurement policies and practices. These have had marked influence upon the industry.

For most of its life, the defense electronics industry has been plagued with an unpleasant characteristic—the constant difficulty in forecasting its future load in research, development, and production. This situation is to a large degree inherent in the character of defense planning. It is also aggravated by several procurement policies, such as the use of parallel research and development contracts, the placing of follow-on orders to other firms than the one that did the original development, the requirement for multiple sources, the enforced spreading of know-how from the originating laboratory to others, and the slow-but-steady Government encroachment on patent rights. Occasionally, specifications may be changed in the midst of a program because of a change in tactics or in the technical concept desired by the military.

In some cases, there may be fumbling at the start of a program that consumes valuable time and necessitates later undesirable compromises and schedule delays. Some of us are convinced that the shifting of production from one contractor to another in mid-stream makes for unreliable equipment. Consequently, there have been serious ups-and-downs, costly both economically and technically to individual companies and to broad segments of the industry. And due to their closely allied natures, what is costly to this industry is costly to national security as well.

Another reason why it is hard to forecast efficiently is obsolescence. The combination of the needs for advanced weapons and the ability of technology to satisfy them has meant that today's weapon is often obsolete by tomorrow. *One may be sure that no electronic device will stay in production for more than a few years at best. It is obvious that while it grew, as well as now, the defense electronics industry had to be adventuresome, flexible and competitively adept.* I am sure that a JAN-approved crystal ball would be of real help at times.

A direct result of rapid obsolescence is that there must be a relatively high percentage of a company's total investment in men and facilities devoted to research and development, perhaps higher than in any other business. Although varying from time to time, we would generally expect about 25% of our manpower to be applied to research and development. And since the profit realized on research and development is less than that from production, the overall return on investment is significantly lowered.

Production Financing

Even if you have a crystal ball, you will need adequate financial backing to participate to any large extent in defense electronics. There is continued effort on contractors to finance their own Government production. While recent pressures by the Government for industry to accept less in progress payments have been relaxed somewhat, companies must be prepared to await payment for work accomplished. For example on fixed-price contracts over $1 million, the maximum income provided by the customer is 90% of direct labor and materials expended on the contract or 75% of all applicable charges. It is not uncommon for companies to have $50-100 million applied to financing Government inventory.

Add to this the fact that many companies today have not yet settled their renegotiations for the years 1952 to date. One can see how financial strength is a prime requirement for anyone seriously considering becoming a key defense electronics supplier.

On the other side of the coin, however, improved procurement policy has been of immense help to the national defense program. The cost-plus-fixed-fee contract has made it possible for the industry to do what it never could have done on a fixed-

(*Continued on page* 29)

BEGIN YOUR RADIO ENGINEERING YEAR WITH MORE THAN 800 NEW IDEAS!

No wonder engineers say the radio-electronics year begins in March! This year, the manufacturers and suppliers for this 12 billion dollar and still growing industry require all 4 floors of New York City's Coliseum to show you their new ideas.

834 exhibitors representing more than 80% of the industry's productive capacity will display all that's new in equipment, component parts, instruments and production at *The Radio Engineering Show.* Attending the Show gives you an opportunity to talk with the men responsible for these newest advances in radio-electronics. The 55 technical sessions of *The IRE National Convention,* with over 200 new papers presented by 22 different professional groups, will also inform you of up-to-the-minute developments in your specialized field of electronics.

Begin the year right. See and hear all that's new in 1957 radio-electronics. Plan to attend or, better still, make your reservations today!

REGISTRATION: IRE Members $1.00
Non-members $3.00

MARCH 18-21

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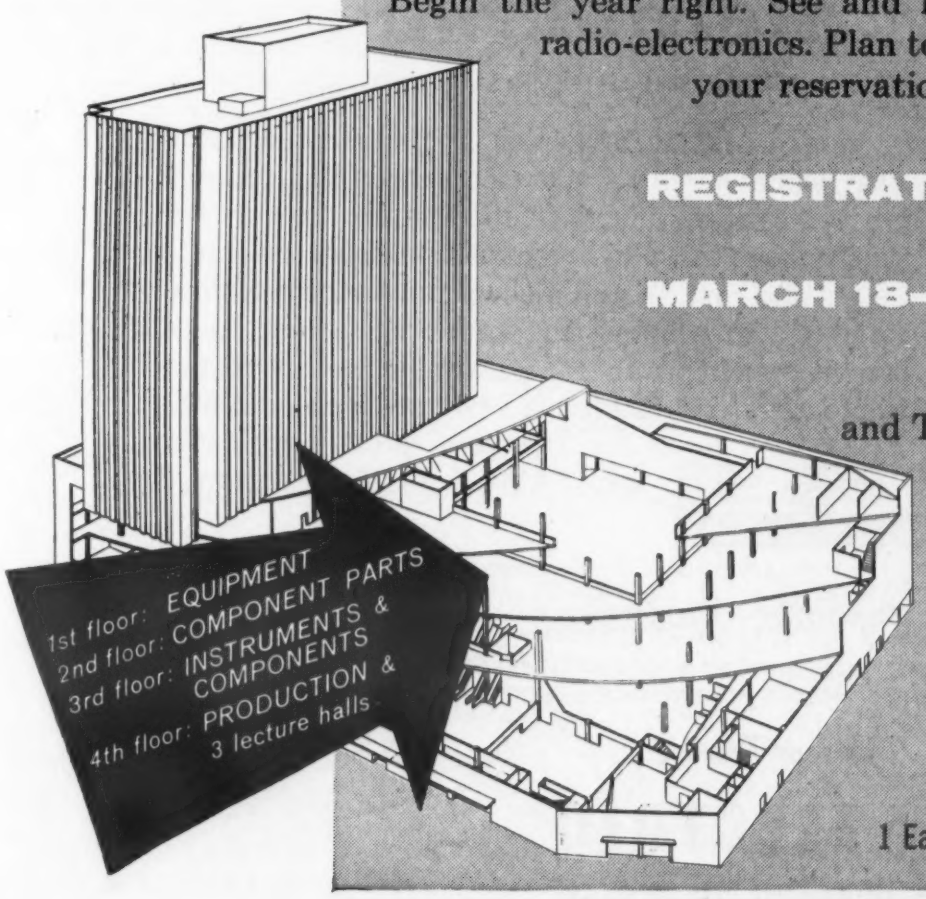
Waldorf-Astoria Hotel
and The Radio Engineering Show
Coliseum
New York City



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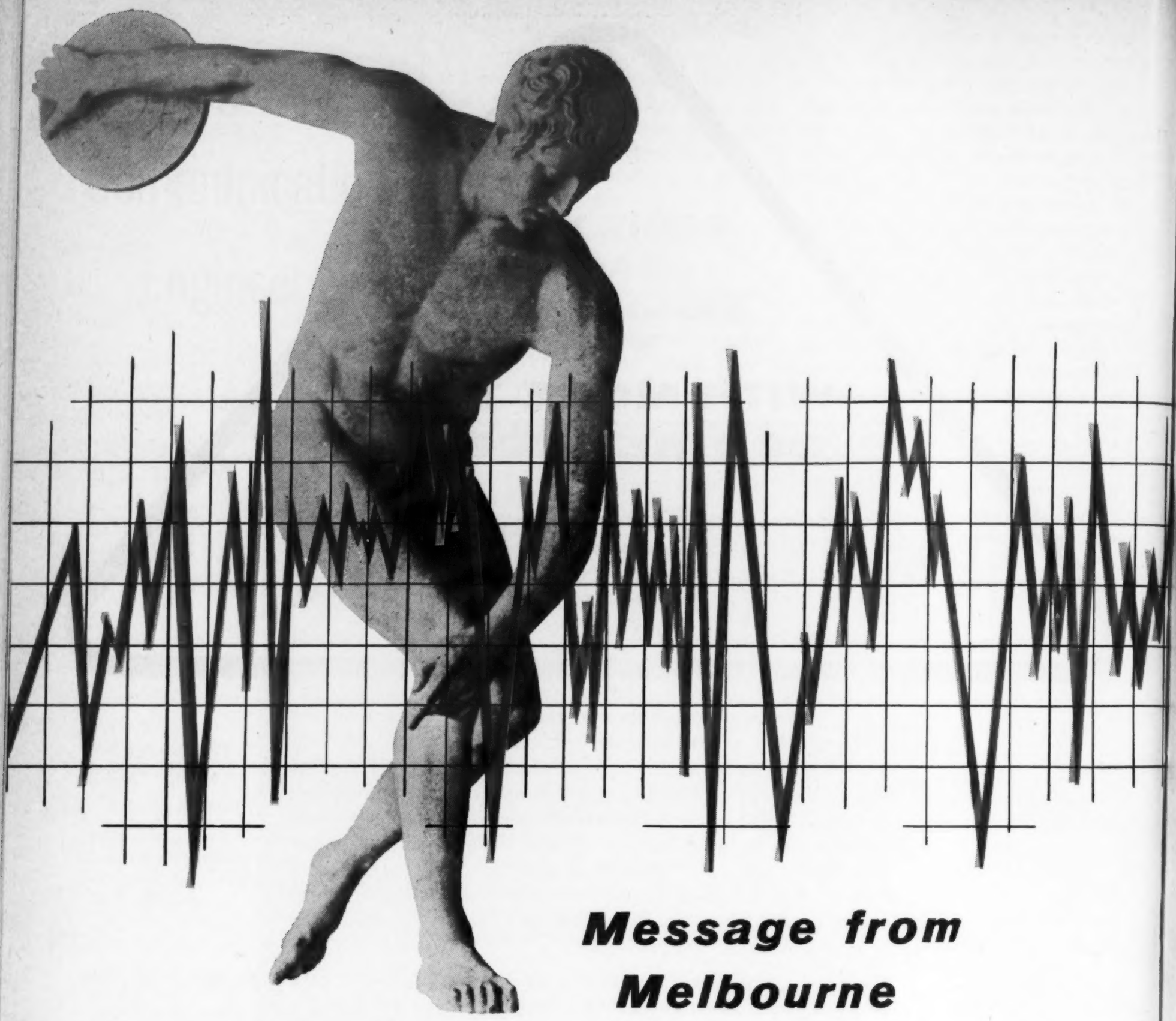

Message from Melbourne

A recent short-wave broadcast from Melbourne, Australia . . . received in Syracuse, N. Y. (over 10,000 air miles) **with no perceptible flutter or fading** . . . is further proof that General Electric's new radio technique . . . Synchronous Amplitude Modulation*. . . is the solution to the problems of long-range radio operations. Its concept and operation are uniquely simple . . . SAM* is compatible with all present forms of radio equipment . . . its operators need no further specialized training . . . yet it preserves complex wave forms even while handling the Doppler effect. Its suppressed-carrier, double-sideband transmission and synchronous reception promise significant savings in weight and cost. Of paramount importance is SAM's* resistance to jamming and interference. Here again, is a vivid example of LMEE's invaluable contribution to progress... in furthering new uses for electronics.

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FRENCH ROAD, UTICA, NEW YORK

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GOVERNMENT

Blade Clearance Measured in Steam Turbines

An electronic instrument that continuously measures the clearance between the rotating and stationary blades inside a steam turbine has been developed by the National Bureau of Standards. This rotor position indicator, designed for the Navy Bureau of Ships, will aid in the study of steam turbines under actual operating conditions.

Maintaining safe axial clearance between rotating and stationary blades is one of the problems in steam turbine operation. The NBS rotor position permits accurate determination of blade clearance by measuring the axial distance from the shrouding around the rotor blade tips to the base of the outer stator blades.

The detecting element of the system is a mutual-inductance micrometer probe in printed circuit form on a ceramic base that resists high-temperature steam erosion inside the turbine.

U. S. Technical Program to Help Japanese Develop Civil Aviation

The progress of Japanese civil aviation, now preparing for the jet age through the purchase of new American-made planes, is to be further advanced through a technical training program being arranged by the International Cooperation Administration.

The Japan Air Lines Co., Ltd., is acquiring four jet and four multi-engined propeller driven airliners at a cost of $42.5 million with the aid of a $24.2 million U. S. Export-Import Bank credit.

Concurrent with this expansion of the Japan Air Lines service, the Government of Japan with ICA assistance will undertake the training of aeronautical technicians in many specialized fields.

FCC Actions

The Federal Communications Commission has granted special permission to American Cables & Radio, Inc., the Commercial Cable Co., and the MacKay Radio & Telegraph Co., Inc., N. Y., N. Y., to establish rates and regulations for the handling of press messages to and from Antarctica via the Navy Coastal Station at Balboa, Canal Zone.

Special permission has also been given by the Commission to Globe Wireless, Ltd., San Francisco, Calif., to establish regulations to provide overseas telex service to subscribers of TWX in the United States.

Shortage of U. S. Army Signal Corps Personnel

There exists in the Signal Corps a shortage of personnel in certain electronic fields.

A great number of shortages are in the top three NCO grades. Interested and qualified personnel may apply for training by submitting a formal application to the Chief Signal Officer through command channels.

Several courses available include training in microwave radio equipment repair, radar repair, carrier equipment repair, and field radio repair.

Contract Awards

Army

Award of a contract for the production of two prototype multi-engine Flying Platforms was announced recently by the Department of the Army. The $500,831 Army contract was awarded to Hiller Helicopters, Palo Alto, California.

The Commerce Department reported that the Army awarded Gilfillan Bros., Inc., Los Angeles, a $2,877,000 contract for guidance equipment for the "Corporal" guided missile.

Navy

The Navy announced recently that it has awarded the following contracts: (a) $29,000,000 to Convair, a Division of General Dynamics Corp., Pomona, California, for the production of guidance and control units for the TERRIER guided missile.

Convair participated in the engineering of the TERRIER missile, which was developed for the Bureau of Ordnance under the technical direction of the Applied Physics Laboratory, Johns Hopkins University. (b) $14,000,000, subject to redetermination at 30% of completion, to the New York Shipbuilding Corp., Camden, N. J., for a guided missile cruiser (CLG) conversion. The cruiser will receive capability to launch TALOS surface-to-air guided missiles aft, while retaining her conventional armament forward. (c) Approximately $600,000 to the Elgin National Watch Company for pilot production of high precision guided missile components, including the Navy's supersonic SPARROW missile. Elgin will make fuzes, safety and arming mechanisms, and related items for the combat interceptor class SPARROW, as well as for a still classified missile. (d) A $19.5 million contract to the Collins Radio Company from BUAER for airborne multi-channel communication equipment in the high-frequency range.

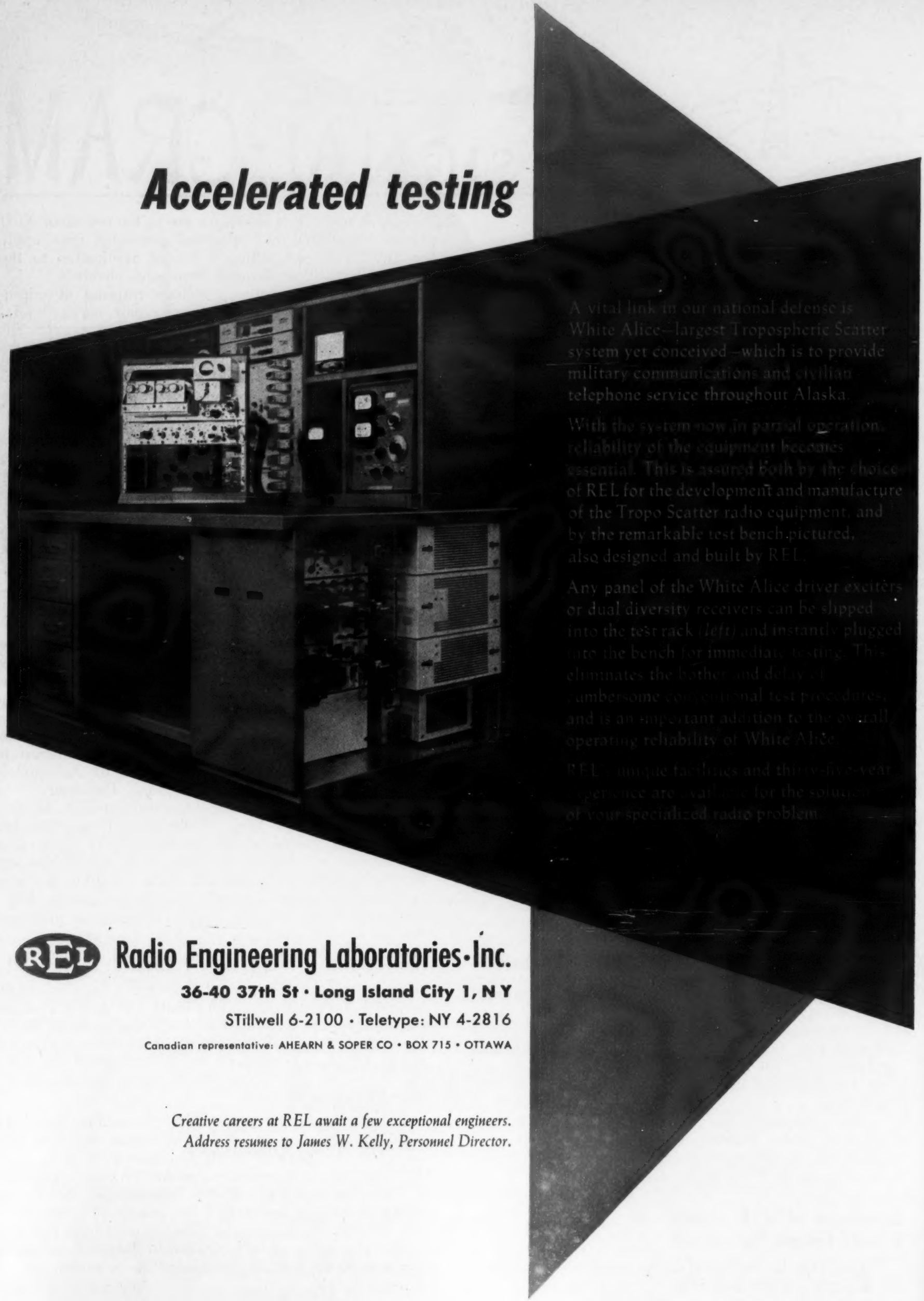
Air Force

A contract for 80 model 310 twin-engine planes for administrative liaison and light cargo use has been awarded to Cessna Aircraft Company's Wichita plant. The contract is expected to amount to over $5,000,000.

The Precision Laboratory, Pleasantville, N. Y., announced recently a contract for nearly $17,000,000 by the Air Materiel Command. The contract calls for additional quantities of GPL developed Doppler navigation systems which are currently used in a variety of Air Force aircraft.

(*Continued on page* 17)

Accelerated testing



A vital link in our national defense is White Alice—largest Tropospheric Scatter system yet conceived—which is to provide military communications and civilian telephone service throughout Alaska.

With the system now in partial operation, reliability of the equipment becomes essential. This is assured both by the choice of REL for the development and manufacture of the Tropo Scatter radio equipment, and by the remarkable test bench pictured, also designed and built by REL.

Any panel of the White Alice driver exciters or dual diversity receivers can be slipped into the test rack *(left)* and instantly plugged into the bench for immediate testing. This eliminates the bother and delay of cumbersome conventional test procedures, and is an important addition to the overall operating reliability of White Alice.

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Creative careers at REL await a few exceptional engineers.
Address resumes to James W. Kelly, Personnel Director.

UMI

WIGWAGS ABOUT LINCOLN'S DEATH

by Mabel E. Deutrich
National Archives

SATURDAY, APRIL 15, 1865. 12:30 A.M. INSTRUCT YOUR PICKETS TO ARREST EVERY MAN WHO COMES NEAR OR ATTEMPTS TO PASS FROM THE CITY. THE PRESIDENT IS KILLED!

This was one of the first of many electrifying reports on the shooting of President Abraham Lincoln and the stabbing of Secretary of State William H. Seward to reach the troops camped on the edge of the District of Columbia and across the Potomac River in nearby Virginia. It was sent by waving torch by the signal detachment stationed on the roof of the Winder Building, just a stone's throw from the White House. The instructions were those of General Martin D. Hardin to Colonel Charles H. Long, commanding Hardin's 1st Brigade at Fort Reno, one of the chain of forts forming a ring around the city of Washington.

The Tragic Shooting

Two hours earlier President Lincoln was shot while attending a performance at Ford's Theater. Secretary Seward, who was home in bed recovering from a carriage accident, was stabbed several times in the face and neck. His would-be murderer transformed the normally peaceful Seward home into a bloody battlefield. The Secretary's son Fred, who tried to restrain the villain and keep him from reaching his father, received a skull fracture. Then, before the assassin fled, he stabbed the Secretary's eldest son, Major Augustus Seward, and his male nurse, Sergeant George T. Robinson. A similar plot for killing Vice-President Andrew Johnson was not carried out because the would-be assassin lost his nerve.

The plot against Johnson, of course, was not known until later, but the city immediately was gripped by fear, gloom and despair. All that night and for the next few days all sorts of wild rumors floated about. A chaotic uncertainty filled the air. Was there more of the plot to be unfolded? Was the Confederacy making one last desperate bid for victory? Did the Secretary of State still live? Were the rumors true that he and his sons had also died? Who had committed the dastardly deeds? Were they identified? Had they been apprehended?

It was vital that the troops in the field be apprised of the calamities. For one thing, they might be able to capture the criminal or criminals. Some of the troops were easily reached by telegraph. Others, much closer to Washington—in fact some just across the river—and hence more apt to be able to apprehend the villains or close their lines of escape, would have been less accessible had it not been for the Signal Corps' flag and torch lines of communications.

The idea of sending messages by flag during the day and by torches at night was the brain-child of Army Surgeon Albert J. Myer. Myer evidenced interest in sign language when he composed "A Sign Language for Deaf Mutes" as his graduation thesis from the Buffalo Medical College in 1851. He was commissioned Assistant Surgeon in the Army in 1854 and shortly afterwards was stationed out west in "the Indian country." It is reported that here his interest in signal messages was further stimulated by the beacon lights and smoke signals the Indians used to send messages from one hill-top to another. By 1860 the Army and Congress had been convinced that personnel could be trained to send messages by flag and torch. Reports of enemy activities and various instructions could be relayed to officers and directions for more accurate firing could be given. The *Official Records of the War of the Rebellion* show that the newly established Signal Corps did indeed provide visual signals during various campaigns and made invaluable observations of Confederate movements thus permitting the Union forces to take the proper steps to meet or counteract many of their plans.

In order to observe and also be in a position to send and receive messages to other relay points, most of the signal stations were elevated. The roofs of buildings and mast heads of ships were utilized, stands were made in tree-tops, and sometimes towers were erected. The essential apparatus, other than the flags and torches attached to poles, was a telescope. This was used not only in making enemy observations but for reading messages wigwagged from other stations. Messages sent and received were recorded in a book and, at the end of the day, the person in charge frequently recorded appropriate "remarks" concerning the weather and other items of interest. Each message station within a Military Department had an identifying code number.

Wigwags Record Events

On the night of April 14, 1865, Lieutenant Paul Brodie was in charge of the small signal detachment posted on the roof of the Winder Building. Among the signal stations with which he had contact, either directly or by relay, were Georgetown Heights and Fort Reno, in Washington; Fort Lyon, Fort Corcoran, Fort Richardson, Fort Ethan Allen, Alexandria, Fairfax Court House, and Falls Church, in Virginia. The messages sent and received by Brodie's detachment early that night (as recorded in his message book which is on file in the National Archives, Record Group 98, Records of the U. S. Army Commands, Department of Washington) reflect nothing unusual. They tell of the illumination of the Capitol and other public buildings, in this way reflecting the feeling of celebration in Washington over General Lee's surrender—the feeling that the long war was reaching its end.

It was not until almost midnight that messages pertaining to the assassination of President Lincoln were sent out. Some of the messages were official communications, others apparently were the passing on of the rumors heard on the streets. The following selected messages from Lieutenant Brodie's record book give us a glimpse into the activities of this eventful time. They illustrate very convincingly early progress in transmitting messages.

Microton hardness test typifies quality control measures that leave nothing to chance at Automatic Electric

STANDARDS THAT DETERMINE RELAY QUALITY

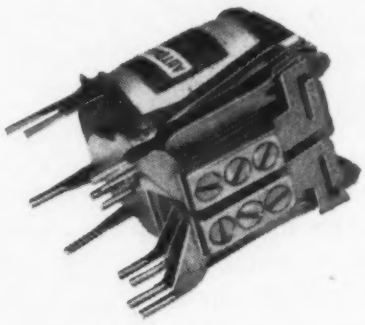
the ideal relay iron

Only soft, pure iron assures proper release, even after millions of operations.

In service, many relays get progressively slower to release, until finally the armature hangs up permanently. Excessively "hard" magnetic relay iron often is to blame. But in all Automatic Electric relays, the magnetic iron is so soft and pure that it saturates quickly, yet the flux dies out instantly. Even after millions of operations!

This improved relay iron is made and rolled to our own exacting specifications. Chemical analysis then makes certain that no magnetic capabilities have been lost. Annealing is rigidly controlled, and grain size and temper carefully checked. Elongation, hardness, permeability, and density tests further safeguard this pampered material. Result: not the *ideal* relay iron, but *the most nearly perfect iron available.*

This is no isolated example. Exhaustive tests prove that all our raw material is equally fine. It's one of the many reasons why Automatic Electric relays enjoy far longer life.



Series SQPC Relay for printed circuitry applications. *Write today for Bulletin RH-9. Automatic Electric Sales Corporation, Chicago 7.* In Canada: *Automatic Electric Sales (Canada) Ltd., Toronto.* Offices in principal cities.

AUTOMATIC ELECTRIC

Originators of the dial telephone • Pioneers in automatic control

GENERAL SYSTEM

UMI

(*LINCOLN—Continued from page* 13)

Friday, April 14, 1865

11:50 P.M. To 2231

TELEGRAPH TO ALL YOUR STATIONS THAT NOBODY IS TO BE ALLOWED TO PASS OUT THE LINES THIS EVENING AND HAVE THEM ALL ARRESTED. COMMUNICATE THIS ORDER TO ALL OFFICERS COMMANDING ALONG THE LINE.

By command of Maj. Gen'l. [Christopher C.] Augur.
J. A. Slipper, Capt. and A.AG.

12:00 M

To Cols. [William S.] King and [Charles C.] Meservey.

NOBODY IS TO BE ALLOWED TO PASS OUT THE LINES THIS EVENING AND HAVE THEM ALL ARRESTED. COMMUNICATE THIS ORDER TO ALL OFFICERS COMD'G. ALONG THE LINE.

By command of Maj. Gen'l. Augur.
J. A. Slipper, Capt. and A.AG.

Saturday, April 15, 1865

12:30 A.M.

To Col. [Charles H.] Long, Comd'g. 1st Brig., Ft. Reno.

INSTRUCT YOUR PICKETS TO ARREST EVERY MAN WHO COMES NEAR OR ATTEMPTS TO PASS FROM THE CITY. THE PRESIDENT IS KILLED.

By command of General [Martin D.] Hardin.
G. Wiard, A.AG.

2:00 A.M.

To Comd'g. Officers, 3rd and 4th Brigades. [Cols. King and Meservey].

IT IS REPORTED THAT THE PRESIDENT HAS BEEN SHOT. ALLOW NO ONE TO PASS THROUGH THE LINES UNTIL FURTHER ORDERS.

PUT YOUR COMMAND UNDER ARMS AT ONCE. ALLOW NO ONE TO PASS THE LINES. ARREST EVERY MAN, WOMAN OR CHILD ATTEMPTING TO PASS ANY BRIDGE OR THROUGH THE LINES. SEND THEM TO DEPARTMENT HEADQUARTERS IN THE MORNING.

By command of Gen. [Gustavus A.] De Russy.
L. A. Chamberlin, A.D.C.

4:00 A.M.

To 2231

NO HOPES OF THE PRESIDENT. SECRETARY SEWARD AND HIS SON ARE IN DANGER. THE SECRETARY'S THROAT IS CUT. HIS SON BADLY STABBED. SEND THIS ALONG THE LINE.

2311

5:45 A.M.

To Commanding Officers, 3rd and 4th Brigades.

KEEP THE TROOPS UNDER ARMS UNTIL FURTHER ORDERS, WITH THE SAME INSTRUCTIONS TO SENTINALS.

By command of Gen. De Russy.
L. A. Chamberlin, A.D.C.

8:30 A.M.

To 2311

IS LINCOLN DEAD?

114

8:30 A.M.

To 114

AT LAST ACCOUNTS HE WAS NOT.

2311

8:30 A.M.

To Commanding Officers, 3rd and 4th Brigades.

KEEP THE TROOPS UNDER ARMS UNTIL FURTHER ORDERS, WITH THE SAME INSTRUCTIONS TO SENTINALS.

By command of Gen. De Russy.
L. A. Chamberlin, A.D.C.

8:30 A.M.

To 2311

IS SEWARD KILLED?

114

(*Continued on page* 16)

Compact Sangamo Dynamotor

Small Size
High Efficiency
Fast Starting
High Power Output

ideal for mobile radio use

the SANGAMO "GY" FLATPAK

The FLATPAK is a rugged, precision engineered dynamotor that is designed for mobile radio and general commercial use. It is of laminated field design, and its compact size makes it ideal for applications where space is a problem. Available in ratings through 110 watts continuous duty and 300 watts intermittent duty. Output to 650 volts.

dependable power supply under severe operating conditions

the SANGAMO TYPE SF

Series "S" Dynamotors are used for both military applications—including aircraft, marine, and missile—and non-military applications where the customers write their own exacting specifications. The Type SF illustrated is ideal for small transmitters.

Models are available to 250 watts continuous and 400 watts intermittent. Input voltage 6 to 115. Output voltage up to 800.

Bulletin 1530 gives full information on these and other Sangamo Dynamotors. Mail the coupon for your copy.

SG56-5

SANGAMO Generators, Inc.
Dept. F, Springfield, Illinois

Please send me Bulletin 1530 on Sangamo Dynamotors.

Name_____
Company_____
Address_____
City & State_____

DYNAMOTORS • MOTOR GENERATORS • GAS ENGINE GENERATORS
ROTARY CONVERTERS • SPECIAL DC MOTORS

(*LINCOLN—Continued from page 15*)

8:30 A.M.
To 114
No.

2311

8:55 A.M.
To 2311
ANY NEWS? NO ONE IS ALLOWED TO COME ACROSS THE BRIDGES.

2231

8:55 A.M.
To 2231
THE PRESIDENT IS DEAD.

2311

9:45 A.M.
To 2311
COL. KING WISHES TO KNOW THE PARTICULARS IN REGARD TO LINCOLN.

114

9:45 A.M.
To Col. King
CAN NOT GET THEM. THE PRESIDENT IS DEAD.

2311

11:00 A.M.
To Cols. King and Meservey.
THE PRESIDENT WAS SHOT ABOUT TEN LAST P.M. WHILE SITTING IN HIS PRIVATE BOX AT FORD'S THEATER AND REMAINED INSENSIBLE TILL HE DIED THIS A.M. JOHN WILKES BOOTH THE ACTOR IS THE SUSPECTED ASSASSIN. SECRETARY SEWARD WAS STABBED AT THE SAME HOUR AT HIS RESIDENCE. MAJOR SEWARD IS DEAD. NO HOPE FOR FRED W. SEWARD. SECRETARY SEWARD IS IN DANGER.

2311

11:00 A.M.
To the line.
MAJOR CLARENCE SEWARD HAS JUST DIED.

2311

11:25 A.M.
To Cols. K[ing] and M[eservey].
THE PRESIDENT DIED THIS A.M. AND MAJOR CLARENCE SEWARD HAS JUST DIED.

Gen. De Russy.

12:15 P.M.
To 2231
BOOTH CAPTURED THIS A.M. TEN MILES THIS SIDE BALTIMORE.

2342

12:30 P. M.
To Cols. King and Meservey.
MAJOR SEWARD IS STILL ALIVE BUT QUITE LOW. THE PRESIDENT'S REMAINS ARE NOW AT THE WHITE HOUSE. BOOTH CAPTURED TEN MILES THIS SIDE BALTIMORE.

2311

12:45 P.M.
To Gen. De Russy.
I HAVE JUST COME FROM DEPARTMENT HEADQUARTERS. MAJOR SEWARD IS STILL ALIVE BUT QUITE LOW. THE PRESIDENT'S REMAINS ARE NOW AT THE WHITE HOUSE. I HAVE NOTIFIED COLS. KING AND MESERVEY. DEPARTMENTS ARE BEING DRAPED THIS MORNING.

Lieutenant [Paul] Brodie
Signal Officer.

1:45 P.M.
To Gen. De Russy.
IF YOU WILL BE PLEASED TO SEND A MESSAGE BY SIGNAL TO COL. TAYLOR OR SOME OTHER OFFICER AT DEPARTMENT HEADQUARTERS ASKING TO BE INFORMED AS TO THE TRUE CONDITION OF THE SECRETARY OF STATE AND HIS SONS, ETC., I CAN THEN FURNISH YOU RELIABLE REPORTS. AS IT IS, I FIND IT DIFFICULT TO LEARN THE TRUTH OR FALSITY OF THE MANY REPORTS BEING CONSTANTLY CIRCULATED.

2311

2:15 P.M.
To Col. [Joseph H.] Taylor, Chief of Staff.
WILL YOU PLEASE INFORM ME AS TO THE CONDITION OF THE GENTLEMEN WHO WERE INJURED LAST EVENING BY THE ASSASSINS?

Gen. G. A. De Russy.

2:15 P.M.
To Gen. Hardin.
WE HEAR THAT BOOTH HAS BEEN ARRESTED. IS IT SO?

C. H. Long, Commanding [1st] Brigade.

3:15 P.M.
To Gen. De Russy.
MR. SEWARD IS DOING WELL. MR. F. W. SEWARD IS IN A CRITICAL CONDITION. MAJOR SEWARD IS SLIGHTLY WOUNDED.

A. E. King, A.A.G.

Sunday, April 16, 1865

6:35 PM.
To 2311
ANY NEWS? IS THE CAPTURE OF BOOTH CONFIRMED?

2231

6:35 P.M.
To 2231
NO NEWS. THE CAPTURE OF BOOTH IS CONTRADICTED IN THE MORNING PAPERS.

2311

7:00 P.M.
To Gen. De Russy, Cols. King and Meservey.
SECRETARY OF STATE IS MUCH EASIER THIS P.M. HIS SON FRED IS STILL SENSELESS.

2311

On the day of the funeral the Signal Detachment was able to perform one last function for their former commander-in-chief. Lieutenant Brodie's "remarks" for the day contain the following:

Wednesday, April 19, 1865

The funeral of the late President took place today. At 9 a.m. I made arrangements to notify by signals the battery near St. John's Church, the time when the column moved. About 10 a.m. it was decided that the battery would be too near Secretary Seward, and it was ordered that I make arrangements to signal to City Hall. In less than an hour communication was opened between City Hall and Winder Building. I rode to the City Hall just in time to see the battery arrive on the ground. Informed the commanding officer as to the arrangements. Placed Privates Nye and Bellows at front of White House, Private Coombs at corner of 17th St. and Pa. Ave. near the War Department, Private Dodge on the Winder Building, and Sergeant Willard Roe and Private Washington Reed on the roof of City Hall. The signals worked well, and from the time the word "Forward" was given, only four seconds were occupied in transmitting the fact to the battery at City Hall. The first gun was fired simultaneously with the first sound of music as the column moved. I joined the procession among the mounted officers among whom I saw Lt. Col. [William J. L.] Nicodemus, Signal Corps; Capt. H. R. Clum, Signal Corps, and others of the Corps. From 10 a.m. till 5 p.m. no communication was had with signal stations across the Potomac.

These, then, are the wigwags and messages which recorded the passing, about niney-two years ago, of a beloved President.

(*SIGNALGRAM—Continued from page* 11)

A $6 million contract for miscellaneous spare parts and modification kits for the B-47 Stratojet bomber has been granted Douglas Aircraft Co., Inc., Tulsa, Okla.

Sperry Gyroscope Company won a $6 million contract for development of radar systems. The equipment is believed to be the smallest for its size and range.

INDUSTRY

Experimental Radar Station

Stanford Research Institute has transformed one of the rolling hills west of Palo Alto into an experimental radar station with installation of a giant 61-foot diameter antenna and 100-megacycle transmitter.

The equipment is being used by SRI's Engineering Division to gather data about the reflection from meteor and auroral ionization of very high frequency and ultra high frequency radio signals.

A SRI team has been assigned to install and operate a similar radar unit at College, Alaska. The northern station is part of an associated program being carried out in conjunction with the Geophysical Institute, University of Alaska. The Alaska installation will have a klystron transmitter in the 200-400 megacycle range and a 61-foot diameter parabolic antenna. The SRI research team will observe the scattering of radio signals by meteor trails in the frequency range exceeding 100 megacycles.

Sponsoring the two-phase program is the Rome Air Development Center, Air Research and Development Command, Griffiss Air Force Base, New York.

Hungarian Refugees Tour Federal Telephone and Radio Company Plant

Forty-seven Hungarian refugees got a look at American industry in action when they toured the huge electronic manufacturing plant as guests of Federal Telephone and Radio Company, Clifton, N. J., a division of International Telephone and Telegraph Corporation.

At the twenty-four acre plant they saw for the first time what a "free enterprise" production system can do.

The huge typical American plant and the manner in which it is operated proved to be an eye opener for many in the group who had been subjected for years to propaganda belittling the American labor system. Among the experiences which they commented on were: the quiet, efficient clean production lines; the fluorescent lighting; the high quality of clothing worn by plant employees while at work; the fact that Negroes worked side by side with Whites in responsible positions contrary to what the group's former masters had told them; and the typical plant cafeteria with its abundance of food.

Improved Electronic Brain

Lockheed scientists, working with a giant new "electronic brain" have come up with some new wrinkles in the way of improving the device's ability to solve complicated problems and have already devised some important programming short-cuts.

Two new systems, unglamourously dubbed MISHAP and FAP, are sets of general instructions fed in the machine and stored in its "memory." With MISHAP (missiles high speed assembly program) so stored, the operator may feed the computer instructions using familiar alphabetic and decimal characters instead of the binary system which expresses all common numbers in terms of the numbers "0" and "1."

MISHAP allows a computer operator to communicate with the machine in a common and easily understood alphabetic and arithmetic combination. Also, the computer automatically assigns storage space in its "memory" to the various bits of information being programmed. Formerly, this had to be done by the operator, and the process was subject to clerical errors which are now eliminated. The missile division's mathematical and computer service department reports that MISHAP halves the time programmers must spend on any particular problem.

The Floating Arithmetic Package (FAP) when "memorized" by the computer allows the programmer to use certain computing "skills" not built into the machine. The main "skills" are floating point arithmetic, standard transcendental sub-routines, input and output on punched cards or magnetic tape, and diagnostic routines.

Lockheed's computing system primarily uses magnetic tape for input and output of information. This, the Lockheed experts say, is an entirely new technique in the field which will result in faster computations.

Revolutionary "Videotape" Recorder

The Ampex Corporation recently delivered pre-production models of their revolutionary "Videotape" recorder, that records picture and sound on magnetic tape, to the CBS television network.

The first use of the "Videotape" recorder by the network will be to overcome the time differential between New York and the West Coast. Thus, West Coast viewers will now be able to enjoy the same flawless quality of live programming that the Eastern viewer has become accustomed to, because of the improved picture quality available via magnetic tape as compared to present fast photographic processes. Perhaps even more important than the reproduction of recorded programs with "live" quality are the operational and economic advantages the Ampex "Videotape" recorder offers the television industry. Programs can be recorded directly from the TV camera, from a TV receiver, from television transmission lines or from microwave relay systems, and then rebroadcast immediately, or delayed indefinitely. The tape requires no processing and can be erased and reused many times.

RCA Head Notes Future of Color TV

"RCA's four point goal for color television in 1957 is to produce and sell 250,000 color sets, to double the number of color programs on the air, to attract sponsors to the new and productive medium, and to encourage others in the industry to enter the field."

Commenting further on the new segment of the television business, Gen. Sarnoff said, "RCA is firmly convinced that color television will provide a greater and more interesting service to the public, a profitable business for broadcasters, manufacturers, distributors and dealers, and a rewarding medium for advertisers. The future of television is in color."

IRE National Convention

50,000 radio engineers and scientists are expected for the annual Institute of Radio Engineers National Convention and Radio Engineering Show, which will be held at the Waldorf-Astoria Hotel and the New York Coliseum, March 18-21, 1957.

A comprehensive program of fifty-five technical sessions is being set up by the Technical Program Committee with the assistance of all the IRE Professional Groups. Thirty-three sessions will be held at the Waldorf and twenty-two at the Coliseum. Two highlight sessions will be "Future Use of Air Space" and "Microminiaturization —The Ultimate Technique."

Transportation Tax

On Property and Accessorial Charges

by Kennedy C. Watkins
Tax Attorney, Washington, D. C.

Editor's note: *The following article discusses a case based on a recent decision by the United States Court of Claims and pertains to certain types of taxable transportation services. Some of these services fall outside the field of the Communications and Electronics industry. Those services which do concern these industries may very well be applicable to many of the readers of* SIGNAL *who handle and ship products. It is for this reason that we are pleased to publish this article by Mr. Watkins.*

OF CONSIDERABLE PRESENT interest and potential value to manufacturers and shippers using for-hire transportation is a recent decision by the United States Court of Claims in the case of *Swift and Co.* vs. *U. S.*, decided October 2, 1956. This decision involves, apparently for the first time, a provision in the regulations of the Commissioner of Internal Revenue which has been in effect since 1942.

Regulations Defined

In substance and in pertinent part, these regulations provide that transportation include accessorial services furnished in connection with a transportation movement, such as loading, unloading, blocking and stacking, elevation, transfer in transit, ventilation, refrigeration, icing, storage, demurrage, lighterage, trimming of cargo in vessels, wharfage, handling, feeding and watering livestock, and similar services and facilities. (Regs. 113, sec. 143.1(d))

The shipper in this test case shipped its product by rail carrier throughout the United States. Its bill for transportation charges consisted of the following items which were separately stated by the carrier:

1. the line haul charge;
2. demurrage charges and, with respect to perishable commodities, charges for ice supplied by the carrier together with charges for switching incidental to icing the cars containing the shipper's property; and
3. the charge on the total of 3% representing the Federal excise tax on the amount paid for the transportation of property.

The sole question for decision was whether the phrase "amount paid . . . for the transportation . . . of property" as used in the statute included charges for icing, salting, switching and demurrage as accessorial charges, thereby subjecting them to tax. Consistent with his regulations, the Commissioner asserted the tax which was paid by the shipper and collected by the carrier. On denial of the shipper's claim for refund, suit was brought in the Court of Claims.

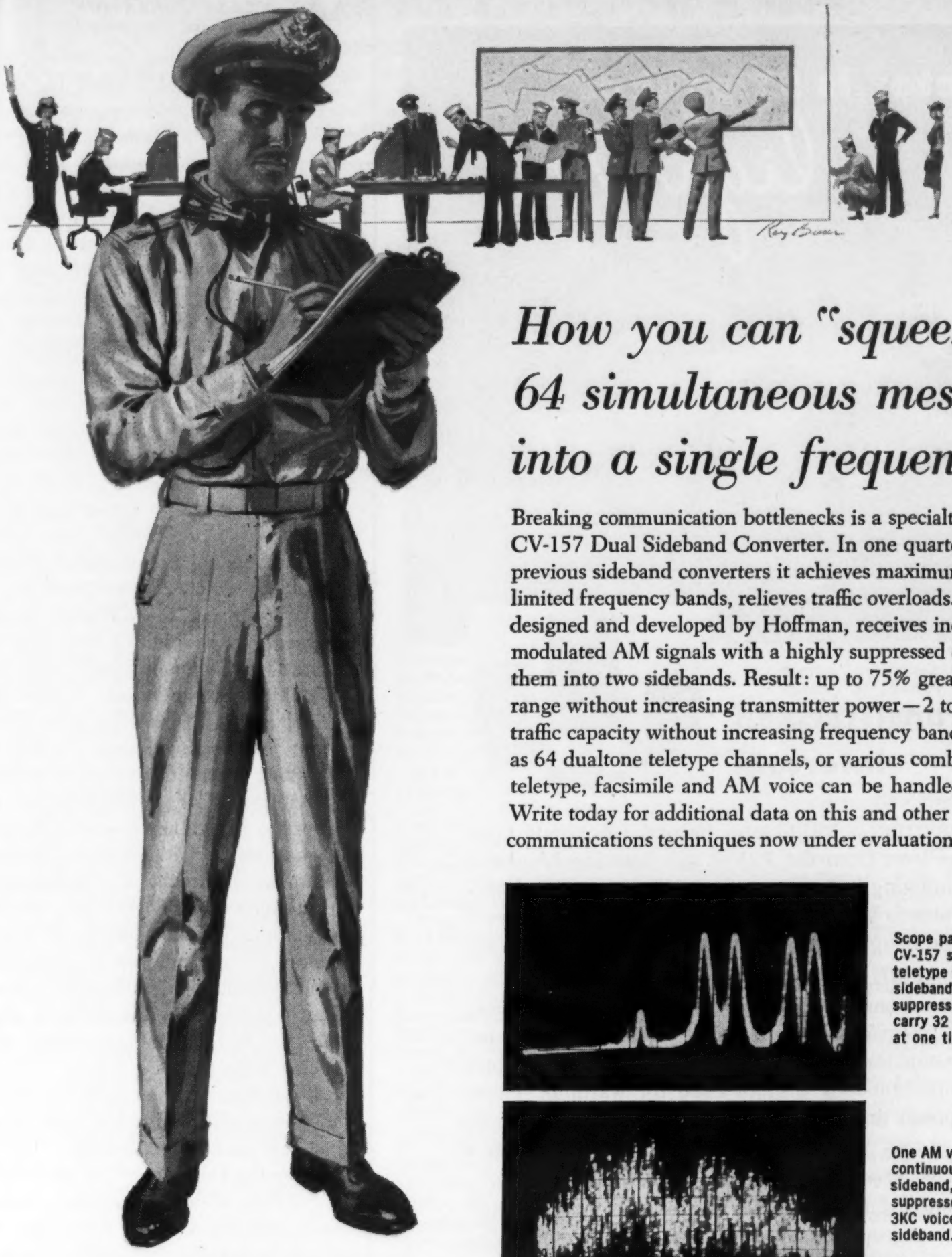
What does "transportation of property" mean? What did Congress intend by the use of this phrase in the taxing statute?

While the Court, in its decision, noted that the term "transportation" had been broadly defined for purposes of the Interstate Commerce Act, it was careful to point out that "the statutory definition of transportation contained in an act designed for the purpose of regulating interstate commerce does not control the meaning of that term in a different act designed for the purpose of imposing a tax on shippers." Continuing, the Court pointed out the absence in the taxing statute of any definition of this term and stated the fundamental rule of statutory construction that, in these circumstances, "the ordinary and commonly understood meaning shall be attributed to the terms employed." Such being the gist of the case, what accessorial services to the transportation of property, if any, did Congress intend to tax? What, in ordinary and accepted parlance, should be included in this category?

Court Answers Questions

The Court answers these questions as follows:

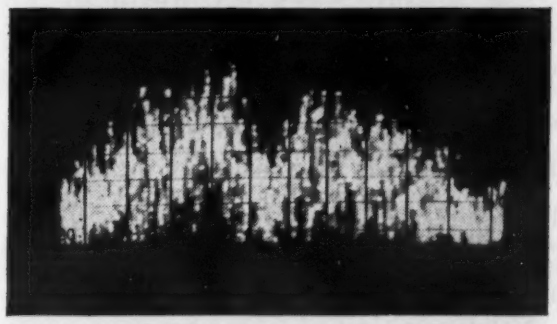
"We believe that Congress intended to impose a tax on the amount paid for actual transportation and not on all of the additional services that may be furnished by the carrier. We believe that payment for any movement of cargo from one



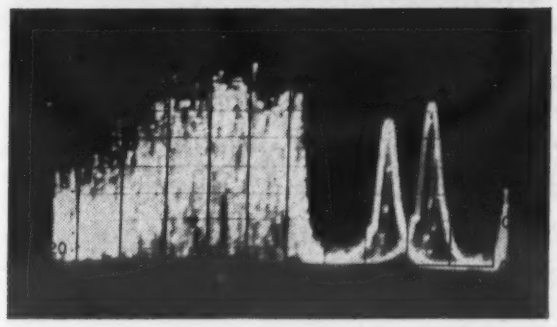
How you can "squeeze" 64 simultaneous messages into a single frequency

Breaking communication bottlenecks is a specialty of the Hoffman CV-157 Dual Sideband Converter. In one quarter the space of previous sideband converters it achieves maximum use of today's limited frequency bands, relieves traffic overloads. The CV-157, designed and developed by Hoffman, receives independently modulated AM signals with a highly suppressed carrier and splits them into two sidebands. Result: up to 75% greater effective range without increasing transmitter power—2 to 32 times more traffic capacity without increasing frequency bandwidths. As many as 64 dualtone teletype channels, or various combinations of teletype, facsimile and AM voice can be handled by the CV-157. Write today for additional data on this and other advanced communications techniques now under evaluation at Hoffman.

Scope pattern taken from Hoffman CV-157 showing two dualtone teletype channels on upper sideband, carrier partially suppressed. Each sideband can carry 32 teletype channels at one time.



One AM voice channel (made by continuous vowel sound) on each sideband, carrier completely suppressed. CV-157 carries two 3KC voice channels on each sideband.



AM voice on lower sideband, dualtone teletype channel on upper. With suitable multiplexing equipment, the CV-157 handles 64 simultaneous dualtone teletype channels.

ALL PHOTOS UNRETOUCHED FROM PANALYZOR MODEL SB-8

Electronics and Mechanical Engineers

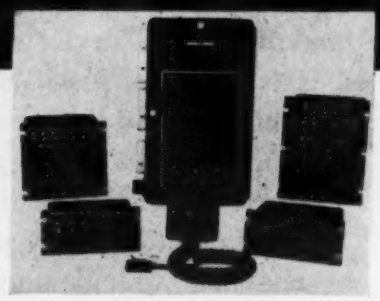
Significant developments at Hoffman in the fields of VLF, HF, VHF, UHF, forward scatter and tropospheric communications, single sideband and advanced ECM techniques have created important positions for engineers of high calibre. Please address inquiries to Vice-President of Engineering.

Hoffman LABORATORIES, INC.

A SUBSIDIARY OF HOFFMAN ELECTRONICS CORPORATION

3761 South Hill Street • Los Angeles 7, California

with TI transistorized intercom



TI PRODUCTION ENGINEERING helped Lockheed trim 55 lb of dead load from the P2V-7 sub-hunting Neptune . . . by transistorizing just one system — the 14-station intercom. In addition to saving weight, safety and reliability were *increased* while maintenance and power drain were *reduced*.

Well within MIL-E-5400 for general performance, MIL-T-5422C for environment and MIL-I-6181B for interference, this TI-built system has been designed for a 2000-hr maintenance cycle and an exceptionally long service life. Signal response is instantaneous without need for warmup. There is negligible power drain on standby and negligible heat dissipation while in use. The system takes power directly from a 28 Vdc line and uses less than 6 watts per station.

This is one example of Texas Instruments *systems engineering* now being applied to audio, radio, radar, sonar, infrared, and other systems for communications, navigation, search, fire control, and missile control. Continuing progress over a quarter century has resulted in over a third of a million sq ft of engineering and manufacturing facilities — soon to be doubled — located in an excellent dispersal area.

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TEXAS INSTRUMENTS
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(*Continued from page* 18)

point on the line to another, including, but not limited to, such things as lighterage, switching, backhauling, are amounts paid for transportation. Amounts paid for ventilation, refrigeration, icing and salting are payments for those services and not payment for transportation within the meaning of section 3475. The above-mentioned services are not intended to be all inclusive, but only illustrative of the distinction between amounts paid for actual transportation and amounts paid for additional services. While the writer of this opinion believes the above should include demurrage, the majority of the Court believes otherwise. Thus demurrage is not included in the services which are not taxable."

The result of the decision to the shipper was a refund of the tax with interest on the amount paid for icing and salting. The effect of this decision is much broader and raises doubt, not so much with the theory of taxing amounts paid for services accessorial to the transportation of property, but rather as to the nature of such services as illustrated by the enumeration in the Commissioner's regulations. Until the law or the regulations are changed or the U. S. Supreme Court rules on this question, this case will stand; a limited victory for the shipper in this narrow area with the burden on the carrier still to collect the tax.

It is not believed that the Commissioner will change his position on just this case. Doubtless he will seek to have the Department of Justice file a petition with the Supreme Court for certiorari (a writ requiring the court to specify more fully) within the 90 days allowed therefor from the date judgment is entered. As a matter of legal forecasting, it would appear that if such a petition is filed, it will be denied, in which event the Commissioner will continue to litigate this question in all other courts than the Court of Claims, hoping to develop a conflict which might precipitate a review of the issue on its merits by the Supreme Court. Until this obtains and if the situation otherwise remains in *status quo*, limited recovery of tax on some accessorial charges

(*Continued on page* 27)

AFCEA Group Members

Communications—Electronics—Photography

Listed below are the firms who are group members of the Armed Forces Communications and Electronics Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCEA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation.

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ACTIVE STUDENT CHAPTERS

Iowa State College, Ames, Iowa
New York University, N.Y.C.
Northeastern University, Boston, Mass.
Norwich University, Northfield, Vt.

Chapter News

Augusta-Fort Gordon

Harvey Christen, an executive of the Lockheed Aircraft Corporation, Georgia Division, was guest speaker at the chapter's October meeting. He presented an informative account on the history of Lockheed and its contributions to military and civilian requirements.

New officers were elected at the November 15th meeting. Chosen to head the chapter for 1957 was Col. Braxton E. Small, TSESS, with other officers named as follows: honorary presidents —Brig. Gen. R. T. Nelson, commanding general, SCTC, Fort Gordon; W. O. McDowell, Southern Bell; Col. Otto T. Saar, SCTC; and J. C. Woodward, Southern Bell, retiring president; vice presidents — E. H. Gibson, Southern Bell; Lt. Col. D. W. Bowman, SCTC and F. A. Saxon, Georgia Power; secretary—Lt. Col. W. O. Beasley, TSESS; treasurer—B. Moody Wilson, Southern Bell.

Board of directors—Col. Lowrey Moore, Maj. Charles Picciuolo, Col. C. R. Dunlap, Col. Philip Rose (all from Fort Gordon); and T. M. Baker, E. L. Lynch, J. C. Woodward and J. E. Breedlove (all from Southern Bell).

The program for the evening included a talk on "Communications, Seventh Army" by Lt. Col. David W. Bowman, and several films of actual installations of communications equipment used during combat by the Seventh Army.

Baltimore

The chapter inaugurated the holiday season with a pre-Christmas dinner party on December 8th. Held at the Officers' Club of Fort George G. Meade, the affair was attended by some 200 members and guests. Chapter business was dispensed with and the evening was devoted to a social hour, dinner and dance.

Decatur

At a recent meeting of the chapter's board of directors, 2nd Lt. Joseph W. Andrasak, 9521st TSU, Decatur Signal Depot, was appointed secretary-treasurer to succeed CWO Alfred A. Mulzet.

The chapter is now engaged in conducting an electronics training course which is open to all its members at nominal cost.

Detroit

Two very successful meetings marked the chapter's fall activities. The first took place at the Civil Aeronautics Administration, Detroit-Wayne Major Airport, on October 20th. This installation has the responsibility of Air Traffic Control in Detroit and other areas in Michigan. The tour included the Detroit Air Route Traffic Control Center, Interstate Airway Communications Station and the U. S. Weather Bureau.

The December 12th meeting was held at the Headquarters of the 30th Air Division at Willow Run Air Force Station. The program was arranged by Col. James I. Vanderhoof, chapter member, and consisted of an unclassified tour of a Control Center of an Air Division, a technical discussion and a question and answer period.

Dinner at the Air Terminal was followed by an informal gathering at the Officers' Club where Colonel Vanderhoof was host. Special guest of the evening was Col. John R. Howland, Regional Vice President, who was making his first visit to the chapter since his appointment in October. Another guest was Casimer J. Gogulski, 1956 AFCEA-ROTC Gold Medal Honor Award winner from the University of Michigan.

Kansas City

The speaker scheduled for the December 6th meeting was Mr. R. B. Alexander, Assistant Project Manager, Engineering, of Western Electric Company, with the DEW Line as the subject. Unfortunately, bad flying conditions prevented Mr. Alexander from arriving in time to present this program and it was re-scheduled for the January meeting.

The Bell System film, "Our Mr. Sun," which dramatizes the role of the sun in the universe, was presented as a substitute program with considerable success. The film was telecast over the CBS network on November 19th and inaugurated the Bell System's new series of one-hour color television programs on science, a series that has been four years in preparation.

London

The British Broadcasting Corporation was host to members and guests of the London Chapter on November 28th. Highlights of the meeting were tours of BBC's new Television Centre and Riverside Television studios.

Program arrangements were made by BBC's Chief Engineer, R. T. B. Wynn, and the head of the Engineering Information Department, L. W. Turner.

Following the tours, which gave the group an insight into British television techniques, the gathering adjourned to the Clarendon Restaurant for a social hour and dinner.

Nagoya

The chapter, in conjunction with the officers of the following Communications and Electronics organizations, gave a Communications-Electronics cocktail party at the Maruei Hotel on Decemer 30th:

Directorate of Communications-Operations, Hq. Fifth Air Force; 1809th AACS Group, 1808th AACS Wing; 5th Communications Group, 5th Air Force (Gifu); 1st Communications Squadron, 5th Air Force; Director of Maintenance-Engineering, Hq. Fifth Air Force; 848th AC&W Squadron, 41st Air Division (Gifu); Air Defense Division (AC&W), Hq. Fifth Air Force; Communications Section, 6101st Air Base Wing; Det. 3, 6922nd RG (Mobile), 6920th Security Wing; SSO 5th Air Force, 49th Fighter Bomber Wing.

Augusta-Fort Gordon Chapter installed new officers for 1957 at its December meeting. At center left, outgoing president, J. C. Woodward, congratulates and hands gavel to newly elected president, Col. B. E. Small. Looking on are Col. Otto T. Saar (left), 1955 president, and now honorary president, and E. H. Gibson, of Southern Bell, first vice president.

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- *SMALL SIZE — ONLY 3 5/16" X 1" X 1 ½"*
- *FREQUENCY SHIFT LESS THAN ±.005% TOTAL FROM −55° C. TO +85° C.*
- *NON-MICROPHONIC*
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- *WORKS DIRECTLY TUBE-TO-TUBE OR TRANSISTOR-TO-TRANSISTOR WITH NO PADDING*
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ELECTRICAL SPECIFICATIONS — MODELS 13MA and 13MB

Center Frequency: 13Mc
Bandwidth at 6 db Attenuation: 30 Kc (Model 13MA)
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Shape Factor: $\frac{60 \text{ db Bandwidth}}{6 \text{ db Bandwidth}} = \frac{1.8}{1}$
Power Insertion Loss: 6 db Maximum
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New York (*Chapter News*)

A lecture-demonstration on the transistor, the mighty midget that is streamlining communication equipment concepts, featured the chapter's December 19th meeting at the Belmont Plaza Hotel. Mr. L. R. Blasius, communications consultant of the New York Telephone Company, presented the program and discussed and demonstrated the applications of the transistor in the industrial, domestic and military fields.

The chapter's annual elections placed into the presidency Col. Benjamin H. Oliver, Jr., Assistant Vice President, American Telephone and Telegraph Company, who served as Chairman of AFCEA's 1955 National Convention.

Other officers were selected as follows: vice presidents—Henry R. Bang, New York Telephone Co.; Edwin C. Carlson, Mutual Life Insurance Co.; Col. Ludwig R. Engler, RCA Communications; treasurer—Maj. Theodore N. Pope, Bell Telephone Laboratories; secretary—Lt. Col. David Talley, Federal Telephone and Radio Corp.; recording secretary—Royal F. Jewett, Western Electric Co.

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Northwest Florida

This chapter also featured the transistor at its December meeting. The lecture-demonstration, entitled "The Mighty Midget—The Transistor," was presented by Mr. D. W. Cusic, representative of the Southern Bell Telephone and Telegraph Company, Pensacola.

Mr. Cusic traced the progress of the transistor from its conception in the Bell Laboratories to the present day. Many examples of the wide-scale use of transistors by the telephone industry were given. Implemented by working laboratory models, the program presented many capabilities of transistors and their application to industry and daily life.

Philadelphia

The chapter's Christmas party was held at the Navy Officers Club, Philadelphia Naval Base, on December 10th and was attended by 150 members and guests.

This annual social event of the chapter enjoyed its traditional success. The program began with a cocktail hour and was followed by dinner and dancing, with music furnished by the Navy Combo.

Pittsburgh

December 14th was the date of the Pittsburgh Chapter's annual holiday celebration. (*See next page*)

Held at the East Liberty Armory, a record turnout of members and guests dined and danced in a holiday atmosphere, with an orchestra and vocalist setting the mood. Valuable door prizes, and a grand prize consisting of an RCA color television set, highlighted the festivities.

Sacramento

"Our Mr. Sun," the Bell System film which predicts developments in the field of solar energy, was the program feature of the December 6th meeting at the Signal Depot Officers' Club.

Among the interesting features in the film are: attitudes toward the sun held by ancient man; physical properties of the sun—size, weight, composition; the sun's surface—the corona, sunspots, solar explosions; how the sun burns; how the sun produces food; and man's attempts to harness the sun's tremendous energy.

During the business session, Lt. Col. Clarence M. Godfrey of the Sacramento Signal Depot was elected chapter president for 1957. Capt. Robert J. McMorrow, also of Sacramento Signal Depot, was re-elected secretary.

San Francisco

The Stanford Research Institute at Menlo Park was host to the chapter on December 6th, with over 150 members and guests attending.

Following a congenial get-together and dinner, the group reconvened at the Institute's auditorium at Stanford Village. Here members of the research staff gave a brief outline of the several phases of research work being done at SRI. This includes studies in basic and applied sciences as well as research in the field of economics. The Institute is also engaged in research for foreign companies and governments.

The group was divided into small units and given a personal escort through the laboratories. The tour included a visit to "ERMA," the Electronic Recording Machine-Accounting soon to be installed for a large banking organization, and visits to the vacuum tube, the antenna and color television laboratory.

Scott-St. Louis

Major General Gordon A. Blake, Assistant Deputy Chief of Staff, Operations, USAF, and a National Director of the AFCEA, was the principal speaker at the chapter's fifth anniversary banquet on December 7th. Other distinguished guests were: Lt. Gen. Charles T. Myers, Commanding General, Air Training Command Headquarters, Scott AFB, and Mrs. Myers; Maj. Gen. E. H. Underhill, Vice Commander, Air Training Command Headquarters, and Mrs. Underhill; John M. Black, Vice President, Southwestern Bell Telephone Company; AFCEA's National President Percy G. Black and Regional Vice President John R. Howland.

Discussing the importance of electronics in military operations, General Blake said, "A keen awareness of the vital defense role to be played by electronics is forcefully exemplified today by our prodigious outlay of funds and effort to build a Distant Early Warning line as the keystone for our countering action against attack." He went on to point out the function of the DEW line in the present and future pattern of defense operations, describing some of the technical obstacles and transportation and construction problems which had to be overcome in building this radar warning system.

He cited two new communications techniques — ionospheric and tropospheric scatter—which provided the answer to the greatest technical difficulty, that of developing a reliable communications system which would tie the warning net together.

The General's talk was supplemented with slides and the recent Western Electric Company film on the DEW line. General Blake also had available for examination by his audience a section of a DEW line plastic radome which covers the search antennas of rotating radar units and which stands up under winds of 180 miles an hour.

The chapter was also addressed by President Black who gave a comprehensive report on association activities in the U. S. and overseas, and by Regional Vice President Howland who pointed out the aims and objectives of AFCEA chapters.

Approximately two hundred members and guests turned out to celebrate this fifth anniversary of the chapter's founding. The banquet was held at Augustine's Restaurant in Belleville, and was followed by a dance.

Switzerland

The Switzerland Chapter held a luncheon meeting at the Hotel du Rhone, Geneva, on December 12th. Chapter President John Gayer welcomed several distinguished visitors, including Harold G. Cowgill and M. H. Woodward, Chairman and Vice-Chairman, respectively, of the U. S. Delegation to the International Telegraph Consultative Committee.

The main item of business was the election of officers for 1957. William Powell Lear, Lear Radio, was chosen president, with the other new officers as follows: vice president for Berne—Col. Robert Miller, SigC; vice president for Geneva—Gerald C. Gross, International Telecommunications Union; vice president for Zurich—Robert F. Holtz, General Manager, RCA Laboratories; secretary—Robert V. Lindsey, C.C.I.R., International Telecommunications Union; treasurer—Cdr. Henry F. Nichol, USNR, American Consulate General.

The following committee chairmen were selected: program—Jack Reid, RCA International Division, Geneva; membership—Robert H. Berle, new TWA Operations Manager, Geneva; co-chairman for associate members—Maj. Clifford Stead, R.Sigs.

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Crosley Division
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Ewen Knight Corporation
Fada Radio & Electric Co., Inc.
Federal Telecommunication Labs.
General Electric Company
General Precision Laboratory, Inc.
Gilfillan Brothers, Inc.
Hughes Aircraft Company
Kahn Research Laboratories
Laboratory For Electronics, Inc.
Laboratory Procurement Office
The Army Signal Supply Agency
Lear, Inc.
Massachusetts Institute of Technology
Lincoln Laboratory
Motorola, Inc.
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Tokyo (*Chapter News*)

Vice Admiral Roscoe F. Good, Commander Naval Forces, Far East, addressed the November 30th luncheon-meeting at the Petty Officers Club, Yokosuka Navy Base, which was attended by 127 chapter members and guests.

He said, in part: "Years of duty in the Fleet—before, during the following two World Wars and Korea—have served only to intensify the sense of importance and urgency which attaches to communications and electronic research, development and application. Other years of duty as a Service Force Commander and as the Deputy Chief of Naval Operations for Logistics have given me knowledge and understanding of the interrelation of military requirements—problems complicated by a fast moving technology that turns such matters as design, production engineering, scarce materials, plant capacities and skilled labor shortages into one relentless struggle against obsolescence. These problems must be dealt with successfully if the military is to have the magic "Black Boxes" in the numbers and at the times and places it needs them.

"All operating forces are also fully aware of their continuing problems of installation and in-service maintenance. In the field, too, industry has helped tremendously by making technical representatives available — around the world and around the clock. Of course, we would like to have industry turn out equipment that needs no maintenance and perhaps someday it will. In the meantime, competent technical representatives are indispensable.

"As the Japanese Self Defense Forces expand in accordance with the six year or some subsequent plan, both Japanese industry and the military service will be confronted by similar problems. I am sure that contacts made at meetings such as this will be helpful in resolving them.

"I recognize, of course, the close liaison between industry and the military is one of the fundamental objectives of your association. The role of communications and electronics in military operations today is a controlling one and a vital one. Nothing we could do would over-emphasize its importance nor lessen the basic need for adequate and progressive industrial support.

"This afternoon you will tour the Ship Repair Facility, Yokosuka, one of the most important elements supporting our operating forces. It is of interest not only because of peculiarities of shipyard equipment and tools but because it is 95% manned by Japanese workmen. It is a working demonstration that the technical and professional standards of the U. S. Navy and the Japanese MSDF can be met by Japanese technicians and equipment. Similar examples can be shown by other military services. This is a good omen for the future."

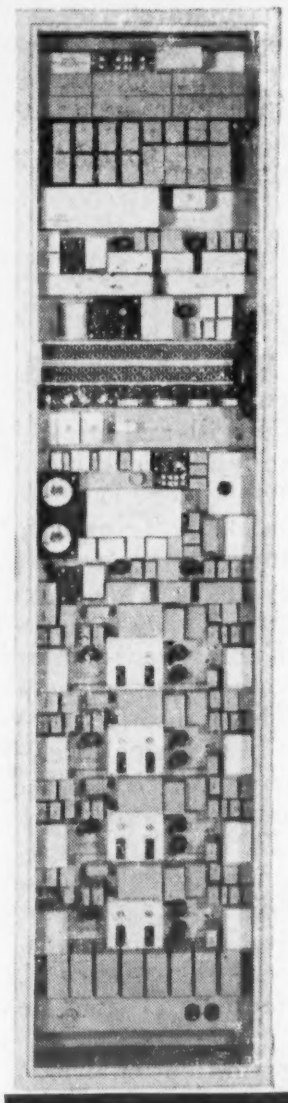
The guided tour of the U. S. Navy Ship Repair Facility was arranged by Capt. J. R. Moore, Commanding Officer of Ship Repair Facility, Yokosuka.

Vice Admiral R. F. Good, Commander Naval Forces, Far East, is shown addressing recent meeting of the Tokyo Chapter. Seated at the right is Rear Admiral A. E. Jarrell, Commander Fleet Activities, Yokosuka. A tour of the Ship Repair Facility, Yokosuka, followed the meeting.

Washington

Dr. W. L. Barrow, Vice President for Research and Development, Sperry Gyroscope Company, Division of Sperry Rand Corporation, delivered a candid appraisal of the defense electronics industry before the January luncheon-meeting of the Washington Chapter.

The enthusiastic reaction of the representative audience of industry and military members was such that the major portion of Dr. Barrow's speech appears on page 6 of this issue for the benefit of all SIGNAL readers.



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(*Continued from page* 20)

may be had by first paying them, filing a claim for refund thereof which, after denial, will permit the institution of suit in the Court of Claims.

Determining Factors

In reaching its conclusion in this case, the Court logically pointed out with considerable telling effect that Congress, in imposing this tax on shippers, could not have intended that they should pay a tax simply because a carrier performs a service in connection with a transportation movement of their property for which an amount is charged when, if it were done by a person other than the carrier, no tax would be due. While the clarity of this is apparent in the circumstances of this case where separate charges were made, what happens when such services as refrigerating may be included as part of the transportation charge? To state the question would seem to answer it.

As indicated by this decision, the distinction, which apparently should be made, is dependent upon whether the service performed by the carrier, for which an additional charge is made, is incident to the actual movement of the property by the carrier in the course of transportation. If so, the tax should apply. Applying this test along with the other one suggested by the court, i.e., if someone other than the carrier performs the service, it would not be taxable, would result in a significant change in the practice and administration by the Commissioner of Internal Revenue of this provision in his regulations. That he is not going to depart, however, from his former position is demonstrated by a recent ruling. In Revenue Ruling 56-590, C.B. 1956-47, 28, he holds that while "stringing pipe" for oil and gas pipe lines is not *per se* taxable transportation of property, if it is done by the carrier which hauled the pipe, it is accessorial thereto and a charge therefor is subject to tax. No tax is due, he goes on to say, if one other than the carrier of the pipe separately contracts with the oil and gas pipe line company to string the pipe.

As stated at the outset, the potentiality of this decision warrants following it with interest.

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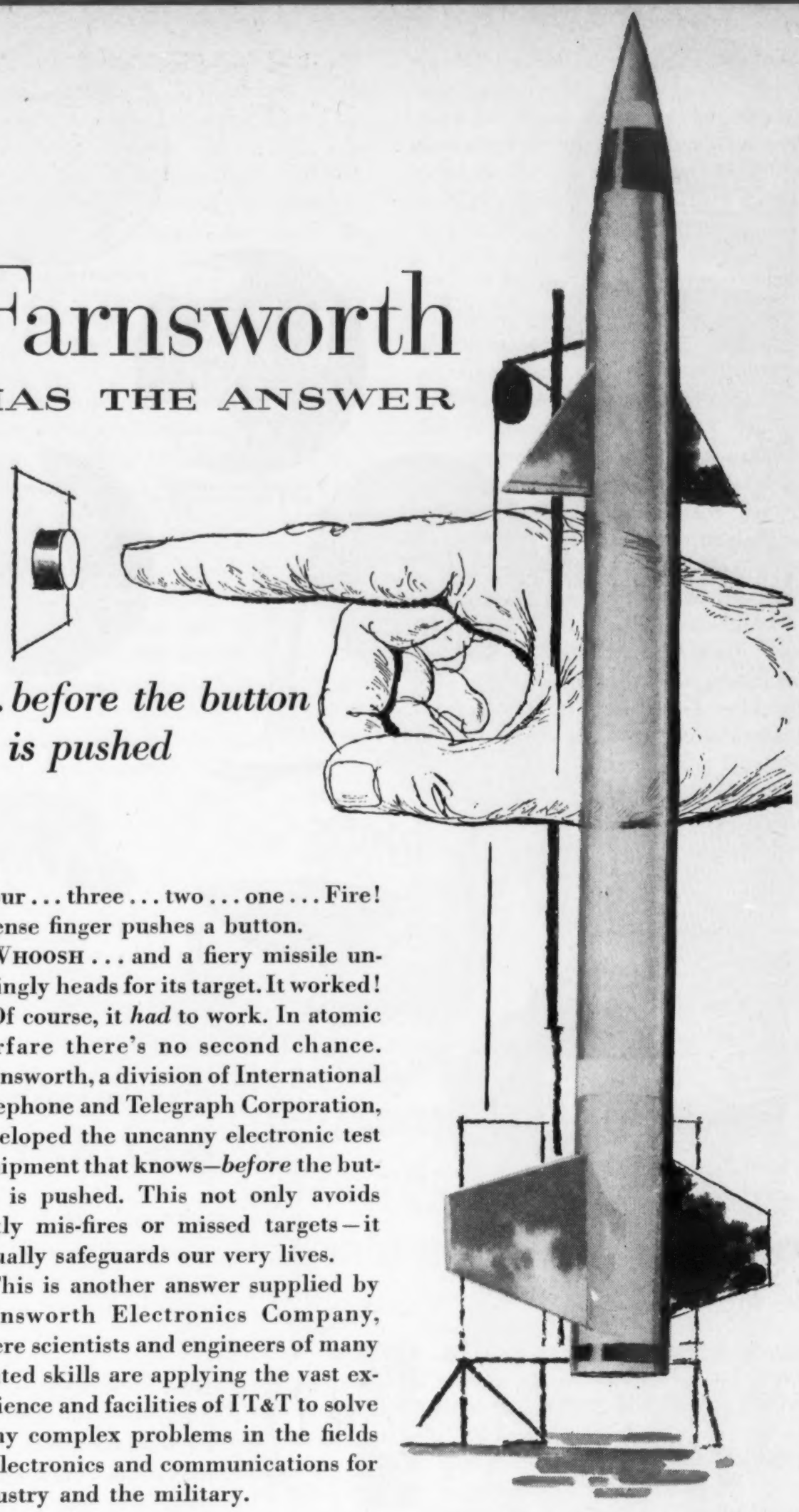

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(*Continued from page 8*)

price basis. Its inherent latitude has made many of the most significant scientific and technical break-throughs possible. Government sponsorship of feasibility studies and the like have made measurable advances possible in all segments of the industry.

An outstanding characteristic of present day procurement is pressure. If it isn't pressure on costs, it's on shorter lead time between weapon idea and weapon in being. More often it's pressure on both. Then there is the pressure to incorporate a multitude of design changes to the equipment throughout production.

Industrial Complex

Out of its expanding needs, the Government has shaped a policy of encouraging and creating competition, and in each area of this business one finds many aggressive companies. A host of small companies have sprung up throughout the country to specialize in components, parts, and sub-assemblies. Many other companies have sizeable organizations and deal in equipments and systems. To this industrial complex has been added a number of large companies who have joined the defense electronics bandwagon. In contrast to the limited laboratories of the early pioneers, we now find giants of the automobile, communications, and electrical industries devoting limitless laboratories to defense electronics.

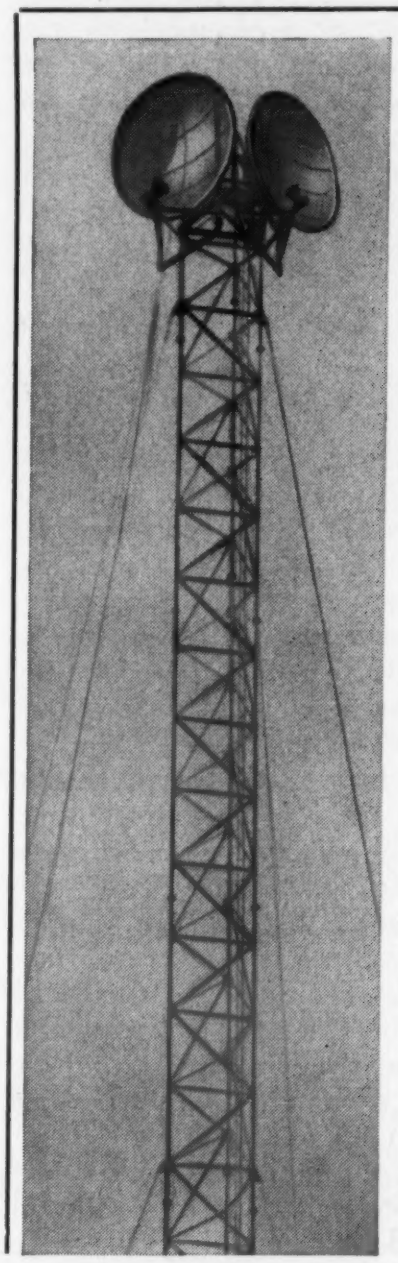
And today, there is underway a large-scale movement by the major aircraft companies to enter the electronics field directly through electronics laboratories and divisions of their own. The additions of such organizations to the industry have not only added millions of square feet of development and production facilities, but they have in certain respects changed the nature of the competition. Those devoted to the industry must also take into account certain organizations which have a somewhat preferred position in the complex. These are the university laboratories, institutional laboratories, military laboratories and other non-profit entities which constantly provide a challenge to the free-enterprise industries in the field. The key word in the industry today is competition.

An important industry trend—and you may have wondered how I managed not to mention it before—is the weapon systems concept. Here, too, competition exists, but in this case the key word is capability. To win, manage, and successfully bring to laudable completion the total responsibility for a large weapon system program calls for a multiplicity of talents and abilities.

Only the very large companies, well-steeped in weapon systems philosophy and well-experienced in the management of large magnitude programs, can successfully execute such programs. It is in this area particularly that the aircraft, automotive and other industrial giants are changing the competitive environment for many old-line companies in defense electronics. Even the largest companies must often depend on Government facilities or support where peculiar requirements of the system cannot be met by the company. An individual company often cannot be expected to supply the larger, rapidly changing test facilities required for a major weapon development. These facilities, in the missile field, for example, must be specially designed for the most part and represent considerable capital outlay. This need has been answered by making Government furnished facilities and Government operated test locations available to contractors where necessary to complete its assignment.

Proprietary Rights

Before closing this review of some of the major aspects of the industry, an important but little publicized problem should be mentioned, namely the problem of proprietary rights. In simplest terms, it is most difficult for industry to protect technical data which it wants to preserve for its own use in the face of a continual military trend to neutralize the rights provided under the Patent Statutes. Following what the government considers a mandate by the Armed Services Procurement Act to maximize competition, it often passes technical data from owner to non-licensed manufacturers. Although the Government agrees in principle that industry is entitled to compensation, it usually exhausts every avenue to get such data free and pass it on without compensating the proprietary owner.



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ITEMS OF INTEREST

From Government, Industry and the Services

Bell Labs Report On "Whiskers"

Bell Telephone Laboratories has announced the discovery of the fact that atomic radiation causes the growth of hairlike metallic strands on metals. "Whiskers," as the strands are called, appeared on certain types of telephone equipment and caused short circuits.

This fact is important since the use of tiny electronic parts in important industries has been accelerated. "Whiskers" could grow between minutely spaced metal surfaces and cause short circuits—a fact which must be taken into consideration when new electronic equipment is made.

Since the scientists at Bell have found these "whiskers" on platings of zinc, tin, and cadmium, the use of these metals has been discontinued and non-whisker sprouting metals have been put in their places.

New Radar In London

The world's first completely crystal controlled all-weather surveillance radar has come into operation at London Airport. This system departs completely from conventional surveillance radar practice concentrating on the 3 cm and 10 cm operational bands. The system operates on the 50 cm band and is almost impervious to weather conditions. It incorporates a moving target indicator system to eliminate permanent echoes. The complete crystal control ensures high operational stability.

Electronics in South Africa

The importance of industry in the Union of South Africa is rapidly growing. Every year existing plants are being reorganized and developed; new and up to date equipments are being introduced to serve new manufacturing programs.

These expanding industries, like industry throughout the world today, rely increasingly on the use of electronics. Consequently there is a demand in South Africa for the development of an internal electronics industry that will be able to meet the growing requirements.

To help in this development and to increase and strengthen their service in the Union both technically and commercially, Mullard Overseas Limited of London has joined the South African Company to organize a technical service department, the object of which will be to provide information on the latest electronic developments and supply application information and technical advice. This service is considered essential to any industry that uses electronic equipment.

Innovation in Recorded Music

Recorded music with up to eight hours of uninterrupted playing time, comparable in quality to any Hi-Fi recording, is now available in a small package not larger than twice the size of an average pocketbook edition. This novel invention was developed after fifteen years of intensive research by the Tefifon-Company in Germany and may revolutionize the entire music reproducing industry, superseding the long-playing record as well as music prerecorded on tape.

Distributed in the United States by the Audio-Master Corporation, this new tone reproducer combines the simplicity of a record with the advantages of tape, yet it is neither tape nor record. The sound is an engraved process on pure vinylite with an average of 82 grooves on a ½-inch band and is self-contained in a cartridge the size of a small book, 6 x 5½ inches.

To play a Sound Book, the window-face is first slid back and the soundband extended in a loop which is then placed around the playing wheel of a special playback machine in the same manner that a record is placed on a turntable. The needle is then set against the soundband and the music starts instantly. If a specific tune or movement is desired, the music selector spots it immediately. In play, the soundband revolves in the form of a figure eight, winding and rewinding automatically, thus eliminating the winding, rewinding, or spooling necessary in ordinary tape playback machines.

Furthermore, the Tefifon soundband cannot break as is the case when tape is handled by inexperienced hands. Since Tefi-tape is engraved, it cannot be erased erroneously, thereby destroying a valuable and expensive recording.

Of utmost importance is the fact that Tefi-tape can be mass produced quickly and inexpensively in the same manner as records are pressed, yet Tefi-tapes are not limited to only one hour of play as in an LP record, but can play 2, 3, 4, and even 8 hours uninterruptedly.

Peaceful Use of Atomic Energy

Small, easily transportable nuclear power plants may soon be generating electricity in remote mining areas and serving as atomic workhorses for scores of other industrial uses in comparatively undeveloped countries.

The dream of the ultimate peaceful use of atomic energy may become a reality in this, a bid by The Hawker Siddeley Group Ltd. of Britain, for leadership in the "new industrial revolution."

This project is important because it will provide easily transportable, small reactors to countries which will not be able to build their own for a long time to come.

Work has been begun on a liquid metal fuel type of reactor which promises to make more efficient use of uranium. The U. K. Atomic Energy Authority has said that this is one of Britain's most advanced projects.

Applications of these lines of research are expected in the generation of electricity, including plants for remote areas such as may be required in the mining industry, for marine propulsion and for the production of process heat.

New B.B.C. Television Studios

The British Broadcasting Corporation has recently put into operational use new television studios in West London, which represent the world's most advanced design in studio techniques.

The electronic equipment includes ten camera channels, together with Vision Mixers of an entirely new type, and a considerable quantity of ancillary equipment, most of which has been supplied by Marconi Wireless Telegraph Co. Ltd. of England.

The Vision Mixing equipment is of particular interest, being of a very advanced type. Very flexible in operation, it has been designed to meet all requirements. It will simplify the smooth presentation of such items as captions appearing over background shots, and will prove particularly valuable at the beginning and ending

UMI

of productions, where such presentation must be changed rapidly.

Colonel Shannon Retires

Colonel Frank J. Shannon, Special Assistant for Electronics to the Director, Directorate of Maintenance Engineering at Headquarters, Air Materiel Command, has recently retired, after more than 26 years of active and reserve duty. He is a member of the Armed Forces Communications and Electronics Association.

New Position for Curtis

Mr. Sidney R. Curtis has recently become Senior Vice-President of Stromberg-Carlson.

A native of Rochester, N. Y., the new vice president has been with the company since 1925 when he received his degree from Yale University. He advanced rapidly, occupying many important executive positions through the years. Before his recent promotion he was Vice President in charge of Government Contracts and head of the new Electronics Division.

Mr. Curtis is a senior member of the Institute of Radio Engineers, The Armed Forces Communications and Electronics Association, and is Vice Chairman of the Military Products Division of the Radio Electronics Television Manufacturers Association.

General Lanahan Made President Of Federal Electric

Major General Francis H. Lanahan, USA (Ret) has been elected President of Federal Electric Corp. of Lodi, N. J., which is the field service and maintenance subsidiary of International Telephone and Telegraph Corp.

He joined Federal Electric in 1955, accepting the post of vice president and general manager, shortly after his retirement from the U. S. Army Signal Corps. The following year, he was elected executive vice president.

General Lanahan joined the Signal Corps in 1926. During World War II he was Chief Signal Officer for the Allied Expeditionary Forces in Europe. Later, he returned to the U. S. to serve as Commanding General of the Signal Corps Center at Fort Monmouth, N. J. In 1951, he was again assigned to overseas service in Europe as the first Chief Signal Officer of the Supreme Headquarters of the Allied Powers in Europe (SHAPE). In 1952, he returned to the U. S. as Deputy Director of Logistics for the Army until his retirement.

Fermi Professorship To Be Established At University of Chicago

Bell Telephone Laboratories plans to endow an Enrico Fermi Distinguished Service Professorship at the University of Chicago in memory of the world renowned nuclear physicist.

Often referred to as "the architect of the atomic age," Enrico Fermi is perhaps best known as the first man to achieve the controlled release of nuclear energy. His classic experiment in this field was carried out at the University of Chicago where, on December 2, 1942, the first controlled nuclear chain reaction was demonstrated. Other achievements of his include studies which led to artificially produced radioactivity and to the control of thermal neutrons, used in several types of modern power reactors. In 1938 Dr. Fermi was awarded the Nobel Prize "for his identification of new radioactive elements produced by neutron bombardment and his discovery, made in connection with this work, of nuclear reactions effected by slow neutrons."

New Air Force Interceptor

The Air Force's latest all-weather jet interceptor, the Convair F-106A, was test flown for the first time at Edwards Air Force Base, Calif.

The F-106A is equipped with the most advanced electronic fire control system and armament yet developed for an Air Force interceptor. The interceptor and its deadly air-to-air armament are designed to operate at stratospheric altitudes.

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MICRORECORDING — INDUSTRIAL AND LIBRARY APPLICATIONS, by Chester M. Lewis and William Offenhauser, Jr., vol. VII. Interscience Publishers, Inc., New York, N. Y. 456 pages, $8.50.

Modern microfilming covers the whole process of recording, reproducing and viewing, indexing and storing all the recorded data that should be accessible to the user. Book literature covering microrecording in general is rather scanty.

Although it is specifically aimed at industrial and library applications, the wide range of technical information covers the microrecording process, films, cameras, readers, and copying. Chapters include business and legal requirements for research retention; processing, projection, and enlargement; and information classification.

THE OSCILLOSCOPE AT WORK, by A. Haas and R. W. Hallows, Philosophical Library, New York, N. Y. 171 pages, $10.00.

Mr. Hallows has translated this volume from its French counterpart, but his many additions and changes render the work more than a mere translation.

A practical guide to applications of the cathode-ray oscilloscope in its many areas of use in the electronics field, this manual concentrates particularly on the application of the oscilloscope in radio and television.

Following a study of measuring electrical magnitudes, the text discusses audio-frequency and radio-frequency amplifiers. The elements of these amplifiers are delineated by photographs showing the distortions that result from poorly adjusted frequencies.

In the section devoted to oscillators, the text illustrates how to deliver a voltage at a required frequency with minimum distortion.

The closing chapter is devoted to improvements and additions such as eliminating the backstroke and using an electronic switch.

It is the author's premise that the oscilloscope has great promise for important new applications in the electronics field.

THE GENERATION OF ELECTRICITY BY WIND POWER, by E. W. Golding. Philosophical Library, New York, N. Y. 318 pages, $12.00.

In this age of electrical power, the possibilities of inexhaustible sources of energy from which power can be generated are being considered seriously. This book gives an account of the research and development of the last few years that have been devoted to conquering the wind.

A discussion of wind—its structure and energy—is followed by a critique of existent wind-driven machines. The bulk of the book is devoted to an evaluation of these machines, the physics and economics involved, to determine the expediency of leashing wind in large quantities to generate electricity.

The text points out that in using wind as a source of power, the greatest difficulty is that the network, into which the power is fed from wind-driven machines, must receive the power at any time.

This problem can be overcome, the author concludes, when wind is combined with several energy sources for maximum power in the generation of electricity.

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